

# ***Consultative Committee for Space Data Systems***

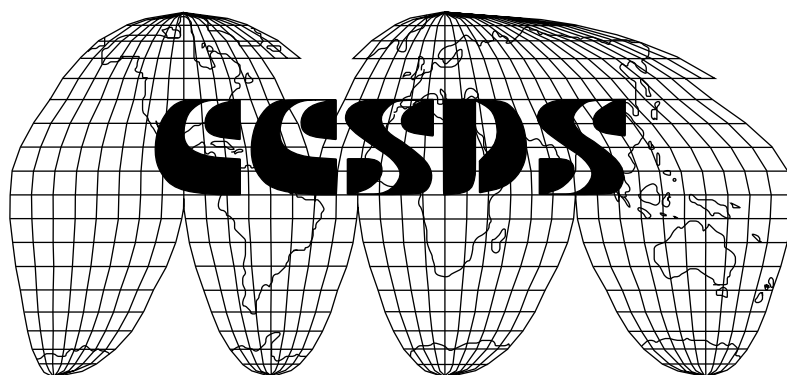
DRAFT REPORT OF THE  
MANAGEMENT COUNCIL

## **CCSDS MANAGEMENT COUNCIL MEETING MINUTES**

CCSDS B10.0-Y-22

DRAFT YELLOW BOOK

June 2001



## DISTRIBUTION

### CCSDS Member Agencies

ASI	Mr. Mauro Donati
BNSC	Dr. Peter Allan
CNES	Mr. Roland Ivarnez
CSA	Mr. Arvind Bastikar
DLR	Dr. Hubertus Wanke
ESA	Dr. Carlo Mazza
INPE	Dr. Eduardo W. Bergamini
NASA	Mr. John Kelley
NASDA	Mr. Tsuguhiko Katagi
RSA	Mr. Vladimir Starostin

### CCSDS Observer Agencies

ASA	Dr. Klaus Pseiner
CAST	Mr. Zhao Heping
CRC	Mr. J. D. Andean
CRL	Mr. Takashi Iida
CSIR	Mr. Renier Balt
CSIRO	Mr. Richard Jacobsen
CTA	Mr. Sergio Costa
DSRI	Dr. Flemming Hansen
EUMETSAT	Mr. R. Wolf
EUTELSAT	Dr. Manual Calvo
FSST&CA	Mr. Jan Bernard
HNSC	Dr. L. N. Mavridis
IKI	Dr. R. Nazirov
ISAS	Dr. Takahiro Yamada
ISRO	Mr. P. Soma
KARI	Dr. Eunsup Sim
KFKI	Dr. Andras Varga
MOC	Mr. Avi Rahav
NOAA	Mr. George W. Saxton
NSPO	Dr. Guey-Shin Chang
SSC	Mr. Lennart Marcus
TsNIIMash	Mr. O. D. Sokolov
USGS	Mr. Tom Kalvelage

## Technical Steering Group and Panel/Subpanel Chairs

TSG	Mr. Manfred Drexler (DLR/GSOC)
P1	Mr. Michel Morlon (ESA/ESOC)
P1A	Mr. Greg Kazz (NASA/JPL)
P1B	Gian Paolo Calzolari (ESA/ESOC)
P1C	Dr. Pen-Shu Yeh (NASA/GSFC)
P1E	Mr. Jean Luc Gerner (ESTEC/ESA)
P1F	Mr. A. Hooke (NASA/JPL)
P1J	Mr. Felipe Flores-Amaya (NASA/GSFC)
P2	Dr. David Giaretta (BNSC/RAL)
	Mr. John Garrett (Raytheon STX)
	Mr. Nestor Peccia (ESA)
	Mr. Patrick Mazal (CNES)
	Mr. Louis I. Reich (CSC)
	Mr. D. Sawyer (NASA/GSFC)
P3	Mr. Maurice Winterholer (CNES)
	Mr. Fred Brosi (GST)
	Mr. Martin Pilgram (DLR/GSOC)
	Mr. Michael J. Stoloff (NASA/JPL)

## Information

Ms. L. Kezer (NASA HQ)  
 Mr. J. Kaufeler (ESA/ESOC)  
 Dr. H. Uhrig (ESA/ESOC)  
 Mr. G. Delmas (ESA/ESOC)  
 Mr. R. Stephens (QSS)  
 Mr. T. Gannett (GST)

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REPORT OF THE MANAGEMENT COUNCIL--MEETING MINUTES

SUBJECT: Minutes of the Consultative Committee for Space Data Systems (CCSDS)  
Management Council (MC) Meeting

PLACE: Oxfordshire, United Kingdom

DATE: June 6-7, 2001

ATTENDANCE

<u>Organization</u>	<u>Name</u>
BNSC	Dr. Peter Allan
	Dr. David Giaretta
CNES	Mr. Roland Ivarnez
	Mr. François Forestier
	Mr. Maurice Winterholer
DLR	Mr. Manfred Drexler
ESA	Dr. Carlo Mazza
	Mr. Michel Morlon
INPE	Dr. Eduardo Bergamini
NASA	Mr. John D. Kelley
	Mr. Andrew Dowen
	Mr. Adrian Hooke
	Ms. Linda Kezer
	Mr. Thomas Gannett
	Mr. John Garrett

## **I-II. CALL TO ORDER, INTRODUCTION OF DELEGATES**

Mr. John Kelley, CCSDS MC Chairman, at 1300 hours on June 6, 2001, convened the meeting. Following the call to order, the delegates and other attendees introduced themselves.

## **III. WELCOMING REMARKS**

Dr. Peter Allen welcomed everyone on behalf of the Space and Science Technology Department at BNSC/RAL.

## **IV. AGENDA REVIEW AND APPROVAL**

ESA requested that their Space Link Protocol paper be discussed under Item 10. The agenda was approved.

The final agenda is shown in Attachment A.

## **V. REVIEW OF MINUTES FROM TOULOUSE, FRANCE**

The minutes from the Fall 2001 meeting held in November 2000 in Boulder, Colorado, were approved.

## **VI. SECRETARIAT REPORT**

The Secretariat's report had been previously distributed to all members. This report contained the list of open action items, along with responses where indicated and a list of CCSDS documents and their status (Attachment B). Note was made of those six CCSDS documents that had achieved IS (International Standard) status since the last MC meeting. Ms. Kezer noted that CCSDS is obligated to notify ISO of any documents that are undergoing review. A resolution was proposed to provide a list of those documents under review/comment along with the proposed changes. This resolution was approved (MC-F00-1). Ms. Kezer presented a new status for action item MC-S00-A03, which was closed. The final decision on this action was that P2 decided not to pursue a parallel review on DEDSL-XML document. The status of open action items is discussed below under item VII.

## VII. REVIEW AND REPORT OF OPEN ACTION ITEMS

Only the open action items from past meetings were discussed. Comments made concerning these open items are included below.

**MC-F00-A06** Continue to explore constraints on release of software that had been prepared in association with development and testing of CCSDS Recommendations.

STATUS: Mr. Kelley reported that Mr. Andrew Downen met with the Legal Staff at NASA. There does not appear to be any problem/constraint to write public domain CCSDS software implementation. This could be done through the Open Software Foundation COSMIC catalogue. Mr. Mazza reported that software would be available free of charge to ESA members, but normally not to non-members, but this could be worked. CLOSED.

**MC-F00-A09** Request one-day session on CCSDS at the Space Ops 2002.

STATUS: Mr. Kelley reported that there will be a CCSDS session as well as a CCSDS booth during the week of October 14, 2002. CLOSED

**MC-F00-A12** Provide material from Panel 3 December Workshop for inclusion in MC record of Fall 2000.

STATUS: Material provided. CLOSED

**MC-F00-A15** Agencies are encouraged to submit papers for presentations at the IAF meeting in October 2001 in Toulouse.

STATUS: No papers were submitted. CLOSED.

**MC-F00-A17** Register "CCSDS" in all Internet domains.

STATUS: CCSDS.com and CCSDS.net have already been registered by other organizations. We would have to be a treaty organization registered by the United Nations in order to use CCSDS.int. CLOSED.

## VIII. AGENCY REPORTS

**ASI.** The ASI delegation did not attend, and no ASI report was presented.

**BNSC** Dr. Giaretta presented the BNSC report. CCSDS recommendations and their associated ISO and BSI standards continue to grow in importance within the BNSC programs. BNSC maintains support to the CCSDS Panels, the TSG and the MC. Starting in April 2001, resources were focused on activities and Panels 2 and 3. A UK CCSDS workshop entitled "The Internet and Space" was held in London on March 20, 2001. Presentations covered a range of CCSDS-related activities undertaken within the UK and one described the experiments on UoSAT-12 of the use of normal IP on a space link.

RAL and DERA are working toward a coordinated UK ground station capability based around the use of CCSDS protocols. The RAL S-band ground station has provided telemetry capture support to the Advanced Composition Explorer (ACE) mission for over three years. The UK is investigating the possibilities offered by the GRID in the context of communicating with spacecraft.

Dr. Giaretta's report is Attachment C to these minutes.

**CSA.** The CSA delegation did not attend, and no CSA report was presented.

**CNES** Mr. Forestier presented the CNES report. He reported that there was a lot of interest in the OAIS. He noted that CNES experts are involved in all panels and subpanels, and described their involvement in each.

Mr. Forestier's report is Attachment D to these minutes.

**DLR** Mr. Drexler reported on DLR's involvement in many aspects of CCSDS, including taking over the chairmanship of the TSG. He reported that the Panel 3 SLE concept is part of DLR's modernization program. DLR's SLE implementation will be based on ESA's implementation. Step one of the implementation will cover RAF, CLTU, and RCF services. Other services will be implemented on a project-need base.

Mr. Drexler's report is Attachment E to these minutes.

**ESA** Dr. Mazza presented the ESA report. He reported that ESA has supported all spring meetings in US except Subpanel 1J and Panel 3 next week. ESA is involved in a number of studies covering CCSDS subjects. Dr. Mazza reported on the missions that are CCSDS compatible. ESA is organizing a TTC workshop at ESTEC at the end of October 2001.

Dr. Mazza's report is Attachment F to these minutes.

**INPE** Dr. Bergamini presented the INPE report. He indicated that INPE continues to support CCSDS and renewed the INPE invitation to host the MC and SC13 meetings in the Fall of 2001 at INPE, in Sao Jose dos Campos.

Dr. Bergamini's report is Attachment G to these minutes.

**NASA** Mr. Kelley presented the NASA report. In the NASA Space Operations Management Office, Mr. Andrew Downen was named Chief Engineer, which includes leading the standards effort. Mr. Bob Stephens was instrumental in obtaining a plaque for Warner Miller, which was presented to him approximately a week before his death.

Mr. Kelley's report is Attachment H to these minutes.

**NASDA**. The NASDA delegation did not attend, and no NASDA report was presented.

**RSA**. The RSA delegation did not attend, and no RSA report was presented.

**IX. REPORT FROM LIAISONS AND REVIEW OF LIAISON RELATIONSHIPS**

**IOAG** – Mr. Roland Ivarnez provided a liaison statement from IOAG to the CCSDS Management Council. At the last meeting, IOAG reiterated the need for SLE transfer. Some of the recommendations are ready and others are being worked. The IOAG also expressed some concern that the CLTU, RAF and RCF services were still not available. The RCF red book should be ready by the end of June. Mr. Ivarnez will report back to the IOAG that books will be provided.

In response to request by IOAG, an action was assigned to Panel 1J to provide a work plan and issues for Radio Metric and Orbit Data standard.

Concern by the IOAG was raised about length of time it takes to develop a standard and how we can effectively reduce this time. The suggestion was made that TSG or Panel chairman present program of work to IOAG to help determine priorities and to provide resources. Mr. Ivarnez will provide this suggestion to the IOAG. If this is acceptable, Mr. Drexler will present the status and work plan to the IOAG.

The MC agreed that the TSG is the intermediate body between IOAG and CCSDS. The TSG will do the technical work and be the formal liaison. Some questions arose about the role of the MC if the IOAG is setting the priorities. This was resolved by noting that the IOAG is indicating their “wishes.” The MC sets the priorities and resources.

The liaison statements from the IOAG is Attachment I to these minutes.

Ms. Kezer presented a list of the current liaisons. The Secretariat will reconfirm the need to continue these liaisons with the respective organizations.

## **X. PANEL and TSG REPORTS**

**Panel 1** – Mr. Michel Morlon reported that several Subpanel meetings were held in the United States and Subpanel 1J was held in Darmstadt, Germany during May. A Panel 1 Plenary was held on May 23 in Pasadena, California. Fall Subpanel meetings will be held in October; the Plenary meeting will take place close to TSG/MC meetings.

Mr. Morlon presented the proposed resolutions from Panel 1. Those that were approved are shown in the Resolutions included in these minutes. The MC concurred in the approval of Patrick Plancke, ESA/ESTEC, as new chairman of subpanel 1K, replacing Damien Maeusli.

Mr. Ivarnez stated he would like to see a work plan. Mr. Drexler reported that the TSG has assigned action for all Panels/Subpanels to prepare a short-term work plan.

The Panel 1 report is Attachment J to these minutes.

**Panel 2** – Dr. David Giaretta reported on the progress of Panel 2 activities. The DEDSL Abstract Syntax and the DEDSL PVL Concrete Syntax were recommended to become Blue Books. The DEDSL XML/DTD Concrete Syntax was recommended as a Red Book and the OAIS Red-2 was recommended to undergo a 2-month review as a Blue Book. The approved resolutions are shown in the Resolutions included in these minutes.

The Fall 2001 meeting is planned for October 22-23 at CNES.

The Panel 2 report is Attachment K to these minutes.

**Panel 3** – Mr. Winterholer provided a status report; however, the P3 workshop will not be held until next week. He reported that Panel 3 does not have a large spectrum of activities, but it required a large amount of work. Panel 3 did not have any resolutions. However, Mr. Winterholer stated that Panel 3 may request MC approval by mail vote of two blue books (RAF AND CLTU) if completed by end of June.

Mr. Winterholer provided a separate report on WG 2/3/5 – SLE, Layering and SLE API.

The Panel 3 report is Attachment L to these minutes.

**TSG** – Mr. Manfred Drexler presented the TSG Report. Some highlights included:

Panel 1 issue – coupled non-coherent ranging optimization involves 1A, E and J action assigned

Action was assigned to all panels to prepare short-term work plan.

CFDP – A Testbed Workshop will be held in fall. The Agenda is being prepared and an invitation extended to all panels.

P1J/K – A WBS is to be generated for theme 3, subtask 4 and theme 4, subtask 2; still open is use of applied language for format definition in the future. A work plan is to be developed for recommendations on Tracking, Attitude, Proximity Operations, Environmental Models, and Astrodynamic Constants.

P1K – A preliminary matrix of onboard services was produced. Action was assigned to Panels 2 and 3 on cross panel support in relevant areas. Cooperation between P1K and ISO TC20/SC14 still needs to be worked. P1K deals very much with industry issues and industry needs to be involved. Discussion was held on whether this is a CCSDS charter issue. Ms. Kezer stated that this should be covered under the Associates Program and is not a charter issue.

P2 – Action assigned to analyze theme 2 in Ops plan.

P3 – Action assigned to analyze theme 3 and draft impact on P3 work breakdown.

Mr. Drexler provided a status on the Operations Plan. Mr. Hooke is working on cross support architecture. Mr. Ivarnez suggested that we keep the Operations Plan very simple.

Security – Security is an important and mandatory item to all Recommendations. Security must be included in every work program. A Security Guidance Green Book will be developed; Mr. Howie Weiss agreed to prepare it. Panels should forward recommendations to Mr. Weiss. The TSG proposed that the MC should not accept books if security is not addressed adequately.

Mr. Drexler presented an overview of the activities related to the CCSDS 20<sup>th</sup> Anniversary and SpaceOps.

The TSG Report is Attachment M to these minutes.

## XI. SPECIAL TOPICS

**20<sup>th</sup> Anniversary** – Mr. Downen stated that a call for papers will be out in July. He hopes to have tracks and theme completed by the end of June. There will be a 1-2 hour plenary session. Mr. Hooke stated that we should have the CCSDS booth manned by all Agencies (not just NASA). Each agency should provide brochures, etc. Messrs. Drexler and Kelley will coordinate activities.

**Interplanetary Internet** – Mr. Adrian Hooke provided a status on the Interplanetary Internet. The MC determined that we do not need a formal liaison with the Internet Society. We already have a relationship through the Interplanetary Internet Research Group (IPNRG), within the Internet Research Task Force. Eric Travis (NASA/JPL) and Robert Rumeau (CNES) co-chair the IPNRG. Discussion was held regarding ESA's Spacelink Protocol paper and a question was raised by ESA. NASA confirmed that the OMNI project was a technology research program, which does not question the fact that the standard for NASA is CCSDS.

Mr. Hooke's report is Attachment N to these minutes.

**XML Workshop** – Dr. Giaretta presented a view of how Panel 2 sees the need and use of XML. An XML Technical Workshop will be held at GSFC in the week starting August 20; all panels are invited.

Mr. Kelley briefed the dual paths for progressing standards to ISO via national technical advisory group paths and the CCSDS path.

**Web Site Improvement** – Mr. Gannett reported that a working group chaired by Norm Gunderson was established to determine the requirements of the CCSDS Web Site and establish basic guidelines. Messrs. Kelley and Downen and Ms. Kezer will meet to provide direction on the next steps.

**Software distribution** -- NASA General Counsel sees no problem in distributing software developed for international public domain implementation. Peter Allan reported that RAL could host a site. We may be able to have the software downloadable from the CCSDS web site.

## XII. ANY NEW BUSINESS

There were no new items brought up under this session.

### **XIII. PLANNING FOR NEXT SET OF MEETINGS**

The MC thanked the British National Space Center (BNSC) for the excellent facilities and hospitality in hosting the June 2001 meetings.

The National Aeronautics and Space Administration (NASA) will host the Fall CCSDS Management Meeting to be held during the week of November 26 in Orlando, Florida, and will also arrange for a tour of the Kennedy Space Center facility and attendance for a Space Shuttle launch.

A tentative invitation was extended from DLR to host the Spring 2002 meeting.

The Fall 2002 meeting marks the 20<sup>th</sup> anniversary of CCSDS. This meeting will be held in conjunction with SpaceOps 2002.

### **XIV. RESOLUTIONS AND ACTIONS**

The resolutions and action items were read and approved.

### **XV. ADJOURN**

Mr. Kelley adjourned the meeting.

**CCSDS MANAGEMENT COUNCIL**

**DRAFT ACTION ITEMS**

**June 6-7, 2001**

The following new action items were established at this meeting:

**MC-S01-A01** In response to request by the IOAG, provide a work plan and issues for the Radio Metric and Orbit Data standard.

Actionee: TSG/Panel P1J

Due Date: November 2001

**MC-S01-A02** Each Agency should provide brochures, etc., for distribution at the 20<sup>th</sup> Anniversary session. Coordinate with DLR/Mr. Drexler and NASA/Mr. Kelley.

Actionee: All Agencies

Due Date: Spring 2002

**MC-S01-A03** Contact Liaison organizations to reconfirm interest.

Actionee: Secretariat

Due Date: November 2001

**CCSDS MANAGEMENT COUNCIL**

**DRAFT RESOLUTIONS**

**June 6-7, 2001**

**MC-S01-1.** The CCSDS resolves to approve the following pink sheets as CCSDS Blue Books contingent on inclusion of changes based upon RIDs approved by Panel 1A at the Spring 2001 Meeting:

- Packet Telemetry Services, CCSDS 103.O-P-1.1
- Telecommand Part 2, Data Routing CCSDS 202.O-P-2.1
- Telecommand Part 3.: Data Management CCSDS 203.O-P-1.1
- AOS, Networks and Data Links Pink Sheets, CCSDS 701.O-P-2.1
- Command Operations Procedure, COP-1, CCSDS 202.1

The Secretariat is instructed to make arrangements for publication.

**MC-S01-2.** The CCSDS resolves to approve to upgrade the Telemetry Channel Coding Pink Sheets to Blue Book status. The Secretariat is instructed to make arrangements for publication.

**MC-S01-3.** CCSDS resolves to dedicate the Telemetry Channel coding Blue Book to the memory of Warner Miller. The citation should read as follows:

“This document is dedicated to the memory of Warner H. Miller of NASA. Warner was a major contributor to CCSDS Recommendations since its inception. He made numerous contributions in such diverse fields as: Error Control Coding, Radio Frequency Modulation, Data Architecture, and Data Compression. A superb technologist, gentleman and friend, Warner was always ready to help, especially young colleagues. His approach to work and life, in general, will be deeply missed by his many friends and colleagues in the CCSDS community.”

**MC-S01-4.** The CCSDS resolves to approve the introduction into the RF and Modulation Blue Book of Recommendations 2.4.17A, 2.4.17B and 2.4.18, on Bandwidth Efficient Modulations, which are the new names proposed for

Recommendations, respectively, 3.3.5A, 3.3.5B and 3.3.6. The Secretariat is instructed to make arrangements for publication.

**MC-S01-5.** The CCSDS resolves to approve the Orbit Data Messages (CCSDS 502.0) as a CCSDS Red Book for Agency review. The Secretariat is instructed to prepare review materials and initiate Agency review.

**MC-S01-6.** The CCSDS approves publication of the report on Navigation Definitions and Conventions (CCSDS 500.0) as an issue-1 Green Book. This document should be released in conjunction with the review of the review for the Orbit Data Messages Red Book.

**MC-S01-7.** CCSDS accepts the nomination of Patrick Plancke, ESA/ESTEC, as chairman of Subpanel 1K in replacement of Damien Maeusli, ESA/ESTEC.

**MC-S01-8.** The CCSDS resolves to publish the CCSDS document Data Entity Dictionary Specification Language (DEDSL) Abstract Syntax (CCSDS 647.1) as a Blue Book and forward to ISO as a Draft International Standard.

**MC-S01-9.** The CCSDS resolves to register the CCSDS document Data Entity Dictionary Specification Language (DEDSL) PVL Syntax (CCSDS 647.2) as a Blue Book and forward to ISO as a Draft International Standard.

**MC-S01-10.** The CCSDS resolves to register the CCSDS document Data Entity Dictionary Specification Language (DEDSL) XML/DTD Syntax (CCSDS 647.3) as a Red Book for a 3-month review, and forward to ISO as a Draft International Standard for a parallel 6-month review.

**MC-S01-11.** The CCSDS resolves to approve the update to the Time Code Formats Blue Book to increase the resolution of the CCSDS Day Segmented (CDS) time code format as Pink Sheets for Agency review. The Secretariat is instructed to prepare review materials and initiate Agency review.

**MC-S01-12.** The CCSDS resolves to approve the release of the seven restructured red books listed below for Agency review. The Secretariat is instructed to make arrangements for publication.

- Channel Coding & Synchronization, Part 1 Synchronous (CCSDS 131.0-R1)
- Channel Coding & Synchronization, Part 2 Asynchronous (CCSDS 231.0-R1)
- TM Space Data Link Protocol (CCSDS 132.0-R1)
- Space Packet Protocol (CCSDS 232.0-R1)

- TC Space Link Protocol (CCSDS 232.0-R1)
- Command Operations Procedure-1 (CCSDS 202.1-R1)
- AOS Space Data Link Protocol (CCSDS 732.0-R-1)

**MC-S01-13.** The CCSDS resolves to release “Overview of Space Link Protocols” as a Green Book (CCSDS 130.0-G-0.3). The Secretariat is instructed to make arrangements for publication.

**MC-S01-14.** The CCSDS resolves to approve “Bandwidth-Efficient Modulation” as a Green Book (CCSDS 413.0-G-1). The Secretariat is instructed to make arrangements for publication.

**MC-S01-15.** The CCSDS resolves to approve “Proceedings of the CCSDS RF and Modulation Subpanel 1E Meeting of May 2001 Concerning Bandwidth-Efficient Modulation” as a Yellow Book (CCSDS B20.0-Y-2). The Secretariat is instructed to make arrangements for publication.

**MC-S01-16.** The CCSDS resolves that the TSG will be the formal technical liaison to the IOAG.

**MC-S01-17.** The CCSDS resolves that there were no further legal impediments for the distribution CCSDS-developed implementations that are considered to be public domain and can be distributed on-line.

**MC-S01-18.** The CCSDS thanks BNSC and the Rutherford Appleton Laboratory (RAL) for providing excellent facilities and efficient logistical support, and for being most gracious host.

## **Attachment A**

### **Agenda**

**CCSDS MANAGEMENT COUNCIL  
AGENDA  
Oxfordshire, UK June 6-7, 2001**

1. Call to Order (1300, June 6, 2001)
2. Introduction of Delegates
3. Welcoming Remarks
4. Agenda Review and Approval
5. Review of Minutes from November 2000 Meeting in Boulder, Colorado
6. Secretariat Report
7. Review and Report of Open Action Items
8. Agency Reports  
(Include ManYears of effort and potential resource issues)
9. Report from Liaisons & Review of Liaison Relationships
10. Summary Reports from Technical Panels
  - Panel 1\*
  - Panel 2\*
  - Panel 3\*
  - TSG
    - Security
    - \*Chairperson reports should include (1) resource and schedule status, (2) panel documents requiring MC approval, and (3) an identification of which of that panel's products should be considered for submission as future ISO standards.
11. Special Topics:
  - Report on 20<sup>th</sup> Anniversary Planning
  - Interplanetary Internet Status Report
  - XML Workshop Report
  - Software Distribution Issues
  - Web Site Improvement Report
12. Any New Business
13. Planning for next Management Council meetings
14. Approval of Resolutions/Action Items
15. Adjourn

**Attachment B**  
**Secretariat's Report**

CCSDS MANAGEMENT COUNCIL

November 29-30, 2000  
(Known Status as of May 2, 2001)

OPEN ACTION ITEMS

F00-A02      Provide inputs for new stations and updates to changed stations to the CCSDS Ground Station Green Book. Inputs/updates should be provided to Panel 1E.

Actionee:    All Agencies

DUE DATE    January 31, 2001

Status:      OPEN

F00-A03      Study additional languages, including XML, for developing a standard language for operational data to enhance interoperability among different application programs used for space craft operations and report at next meeting. Team should also look at end-to-end use and mission life cycle of a standard language. Report on progress of XML workshop.

Actionee:    TSG Chair, P3, Yamada, Giaretta, Peccia

Due Date:    June 2001 meeting

Status:      Workshop to be held in May in California. To be reported at June 2001 meeting

F00-A04      Prepare an explanation of the changes made to the OAIS Red Book to be included when released for next review.

Actionee:    Dr. Giaretta

Due Date:    March 2001

Status:      Closed. Explanation received from P2

F00-A05      Using SCPS software, which has already been approved for international release, as a typical instance, look at any issues related to including such software within their respective distribution systems.

Actionee:    BNSC and CNES

Due Date:    June 2001 meeting.

Status:      Subject to be reported at June 2001 meeting

F00-A06      Continue to explore constraints on release of software which had been prepared in association with development and testing of CCSDS Recommendations.

Actionee:    All members

Due Date:    June 2001 meeting

## REPORT OF THE MANAGEMENT COUNCIL--MEETING MINUTES

### Status:

F00-A08 Provide a plan for the 20-year anniversary and submit to the MC.  
Actionee: TSG Chairman, with Panel Chairs  
Due Date: June 2001 Meeting  
Status: To be reported at June 2001 meeting

F00-A09 Request one-day session on CCSDS at the SpaceOps2002.  
Actionee: Secretariat  
Due Date: March 31, 2001  
Status: To be discussed at June 2001 meeting

F00-A12 Provide material from December Workshop for inclusion in MC record of Fall 2000.  
Actionee: P3 Chairman  
Due Date: January 31, 2001.  
Status: No material provided as of May 1, 2001

F00-A14 Submit comments on the CCSDS Strategic and Operating Plans to TSG Chairman, Manfred Drexler.  
Actionee: All Agencies  
Due Date: March 1, 2001  
Status: TSG Chairman should report on this at MC meeting

F00-A15 Agencies are encouraged to submit papers for presentation at the IAF meeting in October 2001 in Toulouse.  
Actionee: All Agencies  
Due Date: As required by IAF  
Status: The Secretariat is not aware of any papers that were submitted.

F00-A17 Register "CCSDS" in all Internet domains.  
Actionee: Secretariat  
Due Date: January 15, 2001  
Status:

CLOSED ACTION ITEMS

F00-A01 In applying for GSCID, INPE has not received acknowledgement that application was received. NASA will confirm whether INPE's application was received. In addition, a system will be established to acknowledge receipt of applications in the future.

Actionee: NASA

DUE Date: January 15, 2001

Status: CLOSED - SCID issued and receipt acknowledged. Decision made that SCID assignment is made as quickly as an acknowledgement can be prepared.

F00-A07 Provide a status report on the STRV testing.

Actionee: TSG Chairman

Due Date: June 2001 meeting

STATUS: CLOSED - Spacecraft failure precludes any testing

F00-A11 Notify P3 Chairman of SLE and SLE Service Management resolutions.

Actionee: TSG Chairman

Due Date: December 7, 2000

Status: CLOSED

F00-A13 Redistribute the latest versions of the CCSDS Strategic and Operating Plans for Agency comments.

Actionee: Secretariat

Due Date: January 15, 2001

Status: CLOSED- Both documents are available on line. URL was provided to MC members via e-mail on January 5, 2001.)

F00-A16 Establish a working group to recommend upgrades and improvement to the existing CCSDS Web Site

Actionee: Secretariat

Due Date: January 15, 2001

Status: CLOSED - Study Group was established and status will be reported at the June MC meeting.

# REPORT OF THE MANAGEMENT COUNCIL--MEETING MINUTES

As of 2001-04-09

## CCSDS DOCUMENTS-ISO STATUS (Page 1 of 7) (Entities within Parentheses Denote Work in Progress)

Attachment 3

CCSDS DOCUMENTS with STATUS COMMENTS	CCSDS DATE	CCSDS NUMBER	ISO Number	CCSDS/ISO Comment Or ISO DATE
Telemetry Summary of Concept and Rationale` (Determination needed as to purpose of document and then it needs to be rewritten)	87-12	100.0-G-1	N/A	N/A
Telemetry Channel Coding (Pink Sheeted to correct diagrams, add code options and Frame length --- 07-00)	92-05	101.0-B-3	ISO 11754	1999 (DIS Balloting to be Completed 01-08-31 )
Packet Telemetry ( Revised to include Internet Packets --- 08-00)	(00-06)	(101.0-P-4.1)		
	95-01	102.0-B-4	ISO 13419	(RB review completed 01-04)
Packet Telemetry Services (Modified to include IP Packet Services)	(00-10)	(102.0-B-5)		(N229 To ISO; 01-xx)
	96-05	103.0-B-1	DIS 17433	Published 00-01
	(00-10)	(103.0-P-1.1)		(Pink Sheets Review to be completed 01-04)
Lossless Data Compression -	97-05	120.0-G-1	N/A	N/A
Lossless Data Compression	97-05	121.0-B-1	DIS 15887	Published 00-10
Lossy Data Compression (ESA is to write a draft White Book)		Green Book		
Lossy Data Compression		Red Book		
Telecommand Summary of Concept and Rationale (Deing upgraded within CCSDS)	87-01	200.0-G-6	N/A	N/A
Telecommand Part 1 -- Channel Service (Upgraded to include TCP/IP, other packets)	95-11	201.0-B-2	ISO 12171	
	(00-06)	(201.0-B-3)		(DIS Balloting to be completed 01-07-15)

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## CCSDS DOCUMENTS-ISO STATUS (Page 2 of 7) (Entities within Parentheses Denote Work in Progress)

Telecommand Part 2 -- Data Routing Service	91-11	202.0-B-2	ISO 12172	
(Upgraded to carry SCPS-NP&IP Packets in CCSDS frame)	(00-11)	(202.0-P-2.1)		(RB Review to be completed 01-04)
Telecommand Part 2.1 -- Command Operation Procedures	91-10	202.1-B-1	ISO 12173	98-08 (Pink Sheet Review to be Completed 01-04)
(Correct Gaps in States Matrices )		(202-1-P-1.1)		
Telecommand Part 3 -- Data Management Service	87-01	203.0-B-1	ISO 12174	98-07
(Upgraded to carry SCPS-NP&IP packets in CCSDS frame)	(00-11)	(203.0-P-1.1)		(Pink Sheet Review to be completed 01-04)
Proximity-1 Space Link Protocol	(01-01)	211.0-R-3		Released as RB 00-08
Overview of Space Link Protocols		G		Reviewed at 00-10 P1A meeting
Channel Coding and Synch Part 1 (Synchronous)	00-10	131.0-R-1		MC approved 00-06 Release delayed for subpanel review
Channel Coding and Synch Part 2 (Asynchronous)	00-10	231.0-R-1		MC approved 00-06 Release delayed for subpanel review
TM Space Data Link Protocol	00-10	132.0-R-1		MC approved 00-06 Release delayed for subpanel review
TC Space Data Link Protocol	00-10	232.0-R-1		MC approved 00-06 Release delayed for subpanel review
AOS Space Data Link Protocol	00-10	732.0-R-1		MC approved 00-06 Release delayed for subpanel review

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## CCSDS DOCUMENTS-ISO STATUS (Page 3 of 7) (Entities within Parentheses Denote Work in Progress)

Communications Operations Procedure 1	00-10	232.1-R-1		MC approved 00-06 Release delayed for subpanel review
Space Packet Protocol	00-11	133.0-R-1		MC approved RB 00-06 Release delayed for sub- panel review
Space Link Identifiers	00-11	135.0-R-1		RB Review to be completed 01-04
Time Code Formats (Reconfirmed for five years 96-06)	90-04	301.0-B-2	ISO 11104	1991 (Reconfirmed 1996)
CCSDS GSCID Field Code Assignment Control Procedures	99-05	320.0-B-2	Not applicable	Decision made to not progress document
The Application of CCSDS Protocols to Secure Systems	93-10	350.0-G-0.2	N/A	N/A
Radio Frequency and Modulation Systems—P1: Earth Stations and SC	98-06	401.0-B	Not applicable	Not sending document to ISO
(Three B/W efficient modulation techniques added)	(Fall 2000)	(401.0-R-00)		RB Review to be completed by 01-04
Radio Frequency and Modulation Systems – Earth Stations	97-05	411.0-G-3	N/A	N/A
Radio Frequency and Modulation	92-05	412.0-G-1	N/A	N/A
Radio Metric and Orbit Data (Document being updated within CCSDS - exists as draft WB)	87-01	501 0-B-1	ISO 11103	1996
Radio Metric and Orbit Data (Under Development)		Green Book		
Space Data Systems Operations with SFDUs	87-02	610.0-G-5	N/A	N/A
Standard Formatted Data Units—Structure and Construction Rules (Reconfirm for five years 99-06)	92-05	620.0-B-2	ISO 12175	1994
(Corrigendum 1 to Document)	96-11	620.0-B-2/ Cor 1		Reconfirm for 5 years (99-11)

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## CCSDS DOCUMENTS-ISO STATUS (Page 4 of 7) (Entities within Parentheses Denote Work in Progress)

Standard Formatted Data Units – A Tutorial	92-05	621.0-G-1	N/A	N/A
Standard Formatted Data Units – Referencing environment	97-05	622.0-B-1	FDIS 15888	Published 00-12
Standard Formatted Data Units – Control Authority Procedures (Reconfirmed for five years 99-06)	93-06	630.0-B-1	ISO 13764	96-12
Standard Formatted Data Units – Control Authority Data Structures	94-11	632.0-B-1	ISO 15395	98-03
Parameter Value Language, A Tutorial	00-07	641.0-G-2	N/A	N/A
Parameter Value Language Specification (CCSD0006) (Document Updated 00-06)	00-06	641.0-B-1 (641.0-B-2)	ISO 14961	(DIS Balloting to be completed 01-07-22))
ASCII Encoded English (CCSD0002) (Reconfirmed for five years 99-05)	92-11	643.0-B-1	ISO 14962	97-12 Reconfirmed for 5 years until 04-08
Data Description Language EAST Specification (Pink Sheeted to included EAST extensions — 00-08)	95-11 (00-06)	644.0-B-1 (644.0-P-1.1)	DIS 15889	Published 00-12 (N228 to ISO 01-mm)
Data Entity Dictionary Specification Language (DEDSL) Abstract Syntax	00-06	647.1-R-2		Red Book Review Completed 00-12
Data Entity Dictionary Specification Language (DEDSL) PVL Syntax	00-06	647.2-R-2		Red Book Review Completed 00-12
Data Entity Dictionary Specification Language (DEDSL) XML Syntax	01-01	647.3–R-1		Released as RB 00-11
Space Systems - Archiving Space Data (RB-2 prepared from received RID comments)	99-09 (02-03)	650.0-R-1 (650,0-R-2)	CD 14721	DIS Balloting 00-11 (Plan shorted ISO review 01-03)
AOS: Networks and Data Links: Architectural Specification (Upgraded to include Internet Packets)	92-11 (00-11)	701.0-B-2 (701.0-P-2.1)	ISO 13420	97-12 (RB Review to be completed 01-04)

# REPORT OF THE MANAGEMENT COUNCIL--MEETING MINUTES

As of 2001-04-09

## CCSDS DOCUMENTS-ISO STATUS (Page 7 of 7) (Entities within Parentheses Denote Work in Progress)

OBSOLETE DOCUMENTS	CCSDS Date	CCSDS Number	ISO Number	ISO D ate
Advanced Orbiting Systems, Networks and Data Links: Abstract Data Type Library – Addendum to CCSDS 701.0-B-2 Decision made to render document obsolete – 99-05	94-05	705.1-B-1	Not Applicable	Did not progress to ISO
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the Path Service and Protocol – Addendum to CCSDS 701.0-B-2 Decision made to render document obsolete – 99-05	94-05	705.2-B-1	Not Applicable	Did not progress to ISO
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCLC Service and Protocol – Addendum to CCSDS 701.0-B-2 Decision made to render document obsolete – 99-05	94-05	705.3-B-1	Not Applicable	Did not progress to ISO
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCA Service and Protocol – Addendum to CCSDS 701.0-B-2 Decision made to render document obsolete – 99-05	94-05	705.4-B-1	Not applicable	Did not progress to ISO
Advanced Orbiting Systems, Networks and Data Links: Audio, Video and Still-Image Communications Services	94-05	704.0-B-1	DIS 15890	MC Decision to Obsolete document 00-10

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**Attachment C**

**BNSC Report**



## **BNSC Report to the CCSDS Management Council**

**6 June 2001**



### **BNSC Report to the CCSDS Management Council 27 June 2000**

CCSDS recommendations and their associated ISO and BSi standards continue to grow in importance within the BNSC programmes and we maintain our support to the CCSDS Panels, the TSG and the MC. The BNSC resources are managed under contract by DERA. Overall BNSC staff levels for this work have been approximately 2 staff years per year, including industrial support. However, there is currently some refocusing of the support from BNSC in the Panel 1 area.

There are resources via a contract with Vega to prototype SLE services within the UK STRV programme. Work has progressed on this during the last year and plans are in place to test various services once the STRV-1c/d pair of satellites have been launched. The current launch date is not earlier than October 2000 .

BNSC has taken particular interest in Security, the SLE services, Archiving standards, Data Interchange software, Turbo Codes and Interoperability.

Surrey Satellites have become associate members of CCSDS, but they continue to use non-CCSDS protocols in projects such as UoSAT-12.

BNSC responded to the OMG request for expressions of interest as agreed at the December meeting of the CCSDS management council.

#### **Panel 1**

The BNSC work here has been concentrated in the areas of the file delivery protocol (CFDP), security, turbo codes and data compression. The BNSC work on the CFDP has continued on testing and evaluation in collaboration with others e.g. GSFC. On security our work has continued with the extension of the Security Green Book to P2 and P3 and participation in "threat" analyses. In addition we are pursuing funding for work on the Interplanetary Internet.

#### **Panel 2**

BNSC continues to provide the Panel 2 chairman plus one other active member of this panel. Thus we have contributed to the Red Books for the Archive Reference Model and the DEDSL together with work towards new standards flowing from the archive reference model such as Data Ingestion. The Archive Reference Model has been circulated for comments after the delay noted at the last ISO TC20/SC13 meeting. In addition we have developed software routines to facilitate the implementation of the CCSDS Panel 2 recommendations. This has included the production of Java routines to interface between data objects and coordinating similar work from the other panel members. The Solar Terrestrial Physics Data Facility at RAL has been used as a test bed for these routines and to facilitate demonstration of a system using Java beans to access data descriptions from the Control Authority and process data objects.

### **Panel 3**

As reported previously, DERA has placed a contract with Vega to prototype the SLE services for Return All Frames and Forward CLTU within the UK STRV programme. The definition of CLTU-related managed objects in GDMO and ASN.1 has been released. This includes generation of the Guidelines for Definition of Managed Objects (GDMO) which can be used more widely within Panel 3. In addition, Vega have completed the implementation of the prototype CLTU provision and management services.

Looking forward to the launch of STRV-1c/d, a plan has been published for the implementation of SLE service in the DERA/RAL ground segment for STRV. However, at present, there appears to be a shortage of resources to actually perform the full programme of tests. This is being addressed by Vega and DERA.

### **Presentations at Meetings**

A meeting on "Satellite Services and the Internet" was held in London on 17 February 2000. This was attended by approximately 90 people and included a talk on the Interplanetary Internet by David Stanton. Several people mentioned that it was this talk that had attracted them to the meeting. This was despite the fact that the talk was billed as the "Interdisciplinary Planet" on the agenda.

### **ACE and STRV**

The RAL S Band ground station has now provided telemetry capture support to the Advanced Composition Explorer (ACE) mission for nearly two and a half years. This has shown the reliability and good performance achievable with the CCSDS compatible AVTEC decoder system which provides bit synchronization, Viterbi decoding, frame synchronization and Reed Solomon error correction before automatically sending the telemetry frames to the Space Environment Center at Boulder. A near real-time display of the data can be obtained from Boulder at

[http://www.sec.noaa.gov/ace/MAG\\_SWEPAM\\_24h.html](http://www.sec.noaa.gov/ace/MAG_SWEPAM_24h.html)

P. Allan, 23 June 2000

## **Attachment D**

### **CNES Report**

# **CNES REPORT CCSDS MANAGEMENT COUNCIL OXFORD - JUNE 2001**

## **1- POTENTIAL INVOLVED :**

- **CNES manpower involved in CCSDS activities is constant to about 3 man x year**
- **Cnes continues providing chairmanship of panel 3 and ISO/TC/SC13**

## **2-NEW IMPLEMENTATIONS / PRESENTATIONS**

- **Recapitulation of future satellites / launchers, compliant with CCSDS for TLM & CMD :**  
**Ariane; Corot; Demeter; Franco-Bresilien; Jason1; Mars Premier; Megha Tropiques; Microscope; Parasol; Picasso; Pleiades; SMOS; Stentor**

- **Activities connected to the OAIS reference model :**

**Presentations of the OAIS and also EAST and DEDSL in many forums, among them: NEDLIB Workshop in Holland; AIRBUS industry, (which create a working group on archiving for whole airplane documentation); group of universities and laboratories;... It appears that OAIS encounter a great interest**

**It has been proposed to CNES directorate to organise an international meeting in Strasbourg, on archiving; OAIS being the focus point.**

**A project started in CNES in order to develop a light and interoperable version of the OAIS for scientific laboratories**

## **2- CNES ACTIVITIES INTO PANELS :**

**CNES experts are involved into most of the panels; the following could be outlined:**

- **P1A : Contribution to Pink sheets review, concerning: TLM channel coding, Packet TLM; Packet CMD and also to Red Book review concerning the restructuration of TLM and CMD.**
- **P1B : Proposition of a Block Turbo Code for high bit rate link.**
- **P1C : Proposition of a CNES image lossy compression algorithm. Participation to comparative performance evaluation of 2 other algorithms**
- **P1F : Participation to the work concerning simplification of CFDP and also to the InterPlanetary Network group meeting about Internet.**
- **P1E : Active participation processing the RIDs concerning Band Efficient Modulations, in order to push them to Blue status. Also, participation to join panels with 1A and 1B.**
- **P1J : Participation to GB on "Navigation data - Definitions and conventions" and to the WB "Orbit data messages"**
- **P1K : No particular activity during this semester**
- **P2 : Taking into account RID from agencies review, CNES made a new version of: DEDSL- Abstract Syntax-(647.1-R-2.1)  
DEDSL-PVL Syntax-(647.2-R-2.1)  
DEDSL-XML/DTD Syntax-(647.3-R-1)  
Decision to push them to Blue Book, should be taken at AMES Workshop for the 2 first and to Red Book for the last one.**
- **P3 : Participation to the review of SLE Management RB, to SLE Brochure and Executive Summary. Study on SLE Service Management mapping rules.  
Participation to the review of SLE Services (RAF, RCF,FSP,CLTU)**

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**Attachment E**

**DLR Report**

## **DLR Report to the MC**



MCREP0601

### **DLR- GSOC Status Report to the CCSDS Management Council Oxford June 2001**

DLR-GSOC continued its work within the reporting period with emphasis on the work of panels P1E, P1J and P3. Additionally DLR took over the chairmanship of the TSG in Boulder, November 2000

#### **1 PANEL 1E**

DLR participated at the last P1E-meeting and gave a presentation on the capabilities of the DLR Weilheim Ground Station downlink. Based on these capabilities and the capabilities of other networks a modulation scheme for future high data rate transmission was proposed.

An update to the green book Radio Frequency and Modulation Systems, Part 1 Earth Stations was done, which also includes the incorporation of new facilities of the DLR network.

#### **2 PANEL 1J**

DLR has done significant work within P1J and contributed in the development of a draft RB for orbit data messages: Orbit Parameter Message (OPM) and Ephemeris Message (EPM). This book was proposed at the ESOC workshop for agency review. In a next step, tracking data format will be defined. DLR proposes to develop a new ASCII format and not to declare an old binary format (like JPLs ODL) as a standard. Further discussions are necessary.

#### **3 PANEL 3**

DLR leads the P3 subgroup for developing of the SLE transfer service books.

In terms of implementation of panel 3 functionality the SLE concept is part of DLRs modernization program. This covers the upgrade of the base band of the Weilheim ground station and the introduction of ESA s SCOS 2000 (including NCTRS) as a base for the control centre software.

DLR s SLE implementation will be based on ESA s implementation. A decision on the platform to be used is still open. The SLE services will be implemented between GSOC control centre and the GSOC ground station in Weilheim as well as between the GSOC control centre and external agencies. Basic features of the SLE transfer service will be available at DLR at end 2002.

DLR s step one implementation will cover RAF, CLTU, RCF services. Other services will be implemented on a project needed base. Management Services will be covered in the second step. Interfaces for new missions will be established on already implemented interfaces or on SLE based interfaces.

**DLR Report to the MC**

In the COLUMBUS project limited SLE service will be used in the communications network (DAS). The reason is, that ESA / ESTEC wants to use the experience out of the MIR project and also because there are no services defined within SLE to support processed data values. As the COLUMBUS Comms Network has to fit into the GSOC multi mission environment in the long term, there may be a point in future to apply SLE also for COLUMBUS.

DLR highly recommends to look into the panel 3 themes of the CCSDS Ops plan and identify other services needed for mission operations in addition to SLE as e.g. processed data, tracking data and others.

A still open point within the work of panel 3 is the base line for security between agencies

**4 TSG**

DLR-GSOC has taken over the TSG chairmanship. GSOC as a central node in Europe with its Control Centre, the Weilheim Ground station and standing capabilities in network connectivity supports a variety of missions together with partner organisations in a cross support manner. The TSG work therefore fits well into this scenario. Since many CCSDS recommendations have reached a rich and mature state, the present work plans to be executed must be complemented by views on end-to-end aspects and, wherever possible, by concrete testing efforts, also across all panel products. At the Pasadena meeting on May 24<sup>th</sup> - 25<sup>th</sup>, which was the first chaired by DLR-GSOC, this view was visible.

## DLR Report to the MC



### 5 Missions at DLR

#### 5.1 Actual DLR-GSOC Missions

DLR is active in implementations of control centre software for CCSDS missions in the TM/TC software area, to support routine operations at GSOC. The following shall give a brief overview on the missions.

Project	Launch Date	Uplink Compliance	Downlink Compliance	Data Archive
CHAMP	In orbit	Full compliant	Full compliant	Archiving of TF s
GRACE	November 2001	Full compliant	Full compliant	Archiving of TF s
BIRD	August 2001	No CCSDS standard	Full compliant	Archiving of TF s
EUTELSAT HB6	May 2002	Full compliant	Partial compliant	No archiving of TF s

#### Compliances:

- CHAMP & GRACE:

The CHAMP and GRACE (2 flight models) space craft telemetry and telecommand is compliant with the following standards:

- ESA Packet Telemetry Standard, ESA PSS-04-106, Issue 1, January 1988 (Directly derived from CCSDS 102.0-B-2, 'Blue Book', January 1987)
- ESA Packet Telecommand Standard, ESA PSS-04-107.

#### Telemetry specifics:

The project utilizes two telemetry virtual channels; one for real-time data and one for memory dump data, which also carries idle transfer frames. The concept of telemetry source packet segmentation is used.

The telemetry packets, i.e. segmented telemetry packets, carry an additional high-level S/C specific application packet structure.

#### Telecommand specifics:

The project utilizes two telecommand virtual channels and two MAP.

Segmentation is not supported (No PAC).

- BIRD:

The BIRD spacecraft telemetry is compliant with the following standard:

- ESA Packet Telemetry Standard, ESA PSS-04-106, Issue 1, January 1988 (Directly derived from CCSDS 102.0-B-2, 'Blue Book', January 1987)

#### Telemetry specifics:

The project utilizes two telemetry virtual channels, one for real-time data (VC0) and one for memory dump data (VC1). The trailer consists only of the two bytes for the FECW. CLCW is not used.

## **DLR Report to the MC**



### Telecommand specifics:

No CCSDS standard is used. (Low cost project)

- **EUTELSAT W24:**

The EUTELSAT spacecraft telemetry and telecommand is compliant with the following standards:

- ESA Packet Telemetry Standard, ESA PSS-04-106, Issue 1, January 1988 (Directly derived from CCSDS 102.0-B-2, 'Blue Book', January 1987)
- ESA Packet Telecommand Standard, ESA PSS-04-107.

### Telemetry specifics:

The project utilizes one telemetry virtual channels for real-time data. The transfer frame consists of the Sync Pattern and the 6 bytes transfer frame header followed by the housekeeping data. The trailer contains the CLCW and the FECW.

### Telecommand specifics:

Same as for CHAMP/GRACE

- Data Archiving at GSOC:

Currently the virtual channels are demultiplexed at the ground station and archived as transfer frames in separate virtual channels in the ODA format. ODA is the GSOC archive system with no CCSDS standards. When the CORTEX system at the Weilheim ground station is operational in the next days, all virtual channels can be archived in one file and selected virtual channels can be stored in separate files.

## **5.2 Future aspects**

- **EUTELSAT**

HB6 will be the last mission at GSOC out of this series. It is understood, that the EUTELSAT satellites will not change their current standards for their future missions

- **DIVA**

Will be launched in 2004, part of the DLR-GSOC program but up till now no information available so far about TM/TC systems

H. Wanke / M. Drexler  
CCSDS DLR/GSOC

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**Attachment F**

**ESA Report**

Report of ESA delegation  
To the CCSDS Management Council  
**In Oxford (UK), 6-7 June 2001**

**General:**

The spring set of technical panel meetings for this year was arranged to take place in US West Coast except sub-panel 1J, which took place at ESOC and panel 3, planned for next week in UK.

Again, ESA is pleased to note that considerable progress was achieved during the meetings, which have already taken place. It is quite positive to note that the trend for more actual implementation tests between agencies is being confirmed, thus ensuring that proposed recommendations will really lead to interoperability. Particularly positive to note is the fact, that for the case of the CFDP tests, additional tests have been successfully performed at JPL during the spring meetings.

**Support by ESA to CCSDS panel work:**

ESA continues to be committed to support actively all panels, subpanels and working groups of CCSDS. ESA is directly involved in the production and review of all major books. Several key players from ESA within the CCSDS technical management (panel and subpanel chairs or comparable functions) keep ensuring that technical progress is maintained. ESA is ensuring continuity for the panel 1 chairmanship.

Presently, from ESA approximately 15 staff work directly on preparation of CCSDS recommendations and a total of about 5 man-years is spent on CCSDS related standardisation activities internally, in addition to work by contractor staff.

The implementation activities of systems linked to CCSDS recommendations (as e.g. SLE and CFDP) constitute also considerable resources.

These activities are further supported by studies directly covering CCSDS subjects and preparation of recommendations. These studies include work for efficient modulation schemes, work on turbo codes, on SLE (API specification, SLE provider gateway), on data decompression libraries, validation of COP 1 and COP-P protocols and simulation of use of CCSDS recommendations versus COTS IP technology. The outcome of those studies in turn will support the technical panel work and may eventually provide inputs for new recommendations.

In May 2001, ESA hosted Sub-panel 1J meeting at ESOC/ Darmstadt (Germany).

As a member of OMG, ESA is following the activity of the Space Domain Task Force (SDTF).

**Implementations of CCSDS recommendations:**

ESA is actively continuing its policy to implement CCSDS recommendations. As stated several times, ESA's standardisation plan foresees the application of CCSDS recommendations for basically all future missions in the area of Space Communications and consequently, the ground infrastructure is being upgraded to support the corresponding needs. Currently, the ground infrastructure is capable to

support CCSDS compatible missions up to the link layer (i.e. including packet TM/TC). Present and future implementations (e.g. INTEGRAL, ROSETTA, MARS-EXPRESS) cover and will cover progressively SLE services and higher layers.

ESA continues to work on development of space data systems standards within the ECSS system, essentially based on CCSDS recommendations; a Packet Utilisation Standard (PUS) is currently under review.

ESA is organising a TTC workshop at ESTEC end of October 2001, in which it is intended to give a large place to communications related to CCSDS.

**Observations to work of technical panels:**

Considering the limits on available resources for standardisation work, ESA notes with satisfaction that considerable progress was achieved in nearly all areas and many agreements could be reached.

It is quite positive to see that, within the RF&Modulation area, a consensus has been achieved on bandwidth-efficient Modulation schemes and that corresponding recommendations are proposed to become blue books.

ESA wants to contribute to the effort currently made in the CCSDS to facilitate the access of the users to the standards by a new set of documents.

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**Attachment G**

**INPE Report**

**INPE Report  
to the  
CCSDS Management Council  
Chilton, Didcot, Oxfordshire, U.K.  
06-07 June, 2001**

INPE reaffirms its continuing support as a Member of the Consultative Committee for Space Data Systems.

INPE is under the process of having a new Director appointed by the Ministry of Science and Technology, after announcement released in the beginning of December 2000.

INPE maintains its preliminary invitation for hosting in São José dos Campos, in Brazil, a group of the seasonal meetings comprising those of the CCSDS Management Council (MC), of the Technical Steering Group (TSG) and of the SC-13/TC-20/ISO Subcommittee, in a first, future opportunity.

The current commitment of INPE representative experts in the many subpanels of CCSDS are: 3 with P1A; 2 with P1B and P1C; 1 with P1E; 1 with P1J; 1 with P1K; 1 with P2; 1 with P3; 1 with TSG and MC. These involvements have been built up gradually in the last one and half years and, so far, to a significant extent, they are limited to the electronic mail follow up, which includes the documents related to the development of the work being executed by the many panels and subpanels, besides those related to the SC13/TC20/ISO Subcommittee. Therefore, initiatives have been taken for effective participation of some of the experts in the reviewing process of some of the CCSDS documents, under development. With current exception of one the experts, all others are active members of the Brazilian Technical Commission (CE 08:001.06/ABNT) in charge of standardizing 'Space Data and Information Systems', in Brazil. It has not yet been possible to obtain financial resources for effective participation of some of the experts in the CCSDS Panel/Subpanel meetings, but there is a continuous determination in promoting their attendance to the meetings, partially or not.

In view of the current and prospective major contracts related to space activities in Brazil, the outline of a policy for adoption of space data and information systems standards in Brazil is being gradually foreseen in the following, main topics:

- Launching Base Facilities (at CLA, in Alcântara, State of Maranhão, in the North of Brazil);
- International Space Station (ISS);
- Tracking and Control Facilities;
- Mission Data Centers.

Eduardo W. Bergamini  
INPE Principal Delegate to CCSDS

São José dos Campos, May 2001

## **Attachment H**

### **NASA Report**

**NASA Agency Report  
CCSDS Management Council  
June 6-7, 2001**

**Organizational Status**

In the NASA Space Operations Management office, Mr. Andrew Downen was named Chief Engineer. Concurrent duties with this assignment include leading the agency standards effort. He will be providing remarks regarding his new assignment and the evolving process of NASA standards development later in the meeting

In accordance with MC Resolution, "MC-F00-30 In recognition of the extraordinary and long-term technical contributions made by (NASA employee), Mr. Warner Miller, the CCSDS Management Council resolves to award him its highest level of service commendation. The Secretariat is instructed to formulate the citation for review by the Management Council, and to procure a suitable plaque for presentation to Mr. Miller at an opportune time in the near future."

Through the coordination efforts of Mr. Bob Stephens, a plaque was designed and presented by the NASA CCSDS contingent to Mr. Miller just one week before his death. The award was greatly appreciated by Mr. Miller and his family. The recognition of his accomplishments and sincere gratitude of his peers provided comfort and satisfaction to Mr. Miller during this last week of his life. The plaque is aesthetically very pleasing with a personalized commendation on the front and all the Member Agency and CCSDS logos depicted in the background.

**Budget**

The core standardization NASA budget for 2001 remained level at a annual value of \$2.4M. Augmentation of this budget of approximately \$1.0M was made through technology development funding. The translation to full time equivalent employees remained unchanged since the last report.

**Application of CCSDS Standards by the U.S. Department of Defense**

NASA presented an overview of the SCPS Reference Implementation capabilities at a seminar at the National Reconnaissance Office on 3 April. Slides are available from: <ftp://ccsds1.gsfc.nasa.gov/pub/ccsds/NRO-3Apr01>. A similar presentation was given to the NASA Technical Advisory Group (NTAG) on 25 April at Global Science and Technology (GST), in Greenbelt, MD. Slides are at: <ftp://ccsds1.gsfc.nasa.gov/pub/ccsds/NTAG-Apr01/NTAGApr01>. Elements of the SCPS architecture were also presented at the Ground Systems Architecture Workshop (GSAW) hosted by the Aerospace Corporation in El Segundo, CA on February 22.

Of particular note was a chart with two graphs illustrating key statistics about the distribution of the SCPS Reference Implementation. Particularly, the distribution of the SCPS-RI over time has exhibited exponential growth, with the number of outstanding copies more than doubling over calendar year 2000 (to approximately 80 at end of year). Further, the distributions of the SCPS-RI have gone primarily to industry (about 60%), followed by government (about 30%), and academia (about 10%). Both the distribution rate and the demographics of distribution are very encouraging.

Activities related to the flight test on board the UK Defence Evaluation Research Agency (DERA) satellite STRV 1D are on hold as the spacecraft's receivers were inadvertently powered down shortly after launch. DERA has identified the probable cause of the problem, and all hope that it will eventually be resolved favorably.

GSFC has continued to work with the Range Commanders Council to baseline CCSDS Packet Telemetry for use on aircraft and missile test ranges.

The Air Force Satellite Control Network (AFSCN) is planning to migrate from today's circuit-switched architecture to a packet-switched architecture. The AFSCN is very interested in migrating to CCSDS Space Link Extension standards as part of this architectural migration. However, current AFSCN-supported spacecraft do not use CCSDS link protocols, and these spacecraft will need to be supported for a number of years. If the SLE services could be augmented to support these legacy missions, much of the SLE infrastructure could be put into place even before AFSCN-supported spacecraft begin to use CCSDS link protocols. Having a large portion of the SLE infrastructure in-place would, in turn, facilitate the adoption of CCSDS link protocols and higher-layer services in follow-on spacecraft.

The AFSCN is funding Global Science & Technology, Inc., to experiment with enhancements to the SLE services to support legacy, bitstream-telemetry-oriented missions, and to evaluate the suitability of the CLTU SLE service for transmission of their missions' block commands. The enhancements are being prototyped using the SLE Application Program Interface software developed by JPL for the INTEGRAL mission. Preliminary results of the experiments will be available in September 2001.

### **Deployment and Application of CCSDS**

Don Sawyer contributes that the National Space Science Data Center has re-engineered their archive processes and software to more closely align with the concepts in the Panel 2 OAIS Reference Model and other Panel 2 standards. This includes assignment of CCSDS Control Authority Identifiers, the use of Parameter Value Language metadata, the use of SFDU Packaging, and implementation of Archival Information Packages for automated data ingest.

The IMAGE project is using CCSDS Panel 2 standards, including SFDU packaging for CCSDS packet collections and for dissemination of files to the National Space Science Data Center in the form of Archival Information Packages in accordance with OAIS Reference Model concepts.

In the area of Spacecraft Onboard Interfaces, Joe Smith (Subpanel 1K) reports that NASA is continuing its vigorous support of this subpanel activities, most recently with work on the draft White Book. This effort will continue. Activities for the prototyping of SpaceWire and FireWire are continuing through the end of the fiscal year. Planning for next year's prototyping activities is also progressing.

At GSFC, the Standards Coordination Working Group, led by Madeline Butler, the Technology and Upgrades Project, led by Roger Clason, and the Data Systems Standards group, led by Felipe Flores-Amaya, have the responsibility to ensure support to all standards activities. The latter is the forum where CCSDS support is coordinated.

GSFC brought forward a P1B resolution for the MC to formally issue appreciation for members who no longer are able to support, but did a great job for CCSDS.

Future directions for the CCSDS web site are being examined. Several proposals are being evaluated. A GSFC-led team is working on a new set of requirements to reengineer the web site.

**Conferences, Workshops and Open Meetings**

A. Don Sawyer or Lou Reich presented the OAIS Reference Model in various fora:

- GSFC Information Systems Colloquia Committee, 14 February, 2001
- Aerospace Industries Association (AIA) preservation working group, 15 March, 2001: They have decided to use the OAIS as a starting point framework for preservation of 3-D diagrams.

March 27-29, GSFC supported the Range Commanders Council (RCC) meeting at Yuma, AZ.

GSFC personnel supported the NASA Technical Advisory Group meeting April 25-26. Felipe presented GSFC observations on CCSDS management issues, pertaining to the scope and nature of various organizations involved in standards activities

At the NASA Engineering Standards Steering Council meeting on May 1-2, 2001, Andrew Downen described Space Ops is anticipating about 20,000 people at their Fall 2002 meeting. The suggestion was made that CCSDS hold its meeting a few days ahead of Space Ops. It is recommended that the MC should decide what CCSDS should present at Space Ops and further recommends that CCSDS will request a one day session to overlap with Space Ops.

**Attachment I**  
**IOAG Liaison Statements**

## LIAISON STATEMENT FROM IOAG TO CCSDS MANAGEMENT COUNCIL

### BACKGROUND

The Third Interagency Operations Advisory Group meeting (IOAG-3) was held at CNES in Toulouse, France 10- 11 May 2001. During that meeting, it was reported that CCSDS Sub-Panel IJ had agreed to revise the existing CCSDS *Radio Metric and Orbit Data* Recommendation (CCSDS 501-13-1).

During the ensuing discussion, it was noted that some IOAG member agencies have an urgent need for a CCSDS Recommendation defining Radio Metric and Orbit Data exchanges in order to implement a capability to meet existing project schedules. Additionally, it was noted that several different formatting options for the exchange of Radio Metric and Orbit Data had been proposed. Concern was expressed that too many formats might be adopted with the result that real progress toward standardization would be frustrated.

Accordingly, IOAG-3 believed that a Liaison Statement to the CCSDS Management Council was in order:

### LIAISON STATEMENT

At the May 2001 IOAG meeting, it was reported that there is an urgent need for a CCSDS Recommendation defining acceptable methods for exchanging Radio Metric and Orbit Data among agencies in order to meet existing flight project schedules. Accordingly, the IOAG invites the CCSDS Management Council to consider requesting the Panel I Chairman to make presentation to the CCSDS Management Council (MC) and to the Technical Steering Group (TSG) showing the:

- Work Plan required to complete this activity in an expeditious manner
- Resources needed to complete the Work Plan

The IOAG also asks the CCSDS Management Council to make this schedule and resource requirement information available to it for discussion at IOAG-4 in December 2001 so that the IOAG's continuing effort to achieve interagency interoperability can proceed on schedule.

## **LIAISON STATEMENT FROM IOAG TO CCSDS MANAGEMENT COUNCIL**

### **BACKGROUND**

The Third Interagency Operations Advisory Group meeting (IOAG-3) was held at CNES in Toulouse, France 10-11 May 2001. During that meeting, all IOAG member agencies reported their implementation progress for the Space Link Extension (SLE) Services Interface, which is based upon the existing CCSDS Red Books. ESA and NASA/JPL reported that successful transatlantic testing of the CLTU, RAF, and RCF services has been completed. Several other agencies noted that they have been awaiting the completion of CCSDS Blue Books before undertaking their implementation programs themselves.

During the meeting, reports were provided suggesting that the CLTU, RAF, and RCF Red Books will not become Blue again at the June 2001 Management Council meeting. Some IOAG Delegates reiterated their concern expressed at IOAG-2 in October 2000 that the lack of Blue Books does not provide the intended incentive and motivation for implementation of the services interface by several agencies. Further, it was reported some proposed changes to the existing Red Books might be inconsistent with the implementation programs now nearing completion for the CLTU, RAF and RCF services.

Accordingly, IOAG-3 believed that a second Liaison Statement to the CCSDS Management Council was in order:

### **LIAISON STATEMENT**

1 -1

At the May 2001 IOAG meeting, some concern was expressed that the CCSDS Blue Books for CLTU, RAF, and RCF services were still not available, while both ESA and NASA have expended substantial amounts of money in implementing the SLE Services interface based upon the versions of Red Books.

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**Attachment J**  
**Panel 1 Report**

# P1 Chairman Report to the CCSDS Management Council

June 2001, Oxford, UK

## Contents

1. Meetings
2. State of Activities
3. Resolutions
4. Considerations for MC

## 1. Meetings

### • Past Meetings

A whole sequence of Sub-panel meetings took place in the time frame May 9-24 2001 as follows:

- P1A,P1B,P1C,P1E,P1F,P1K  
and combined P1A/P1B,P1A/P1E,P1B/P1E,P1J/P1K  
at Pasadena, US, May 15-24
- P1J at Darmstadt, Germany, May 9-11

Panel 1 Plenary took place at Pasadena on May 23

### • Future Meetings

- Next Sub-panel meetings will take place in autumn 2001 in Europe, close to the TTC workshop at ESTEC (October 29-31)
- Next Panel 1 Plenary will take place in autumn 2001 in US, close to TSG/MC meetings

## 2. State of activities (1)

### • Sub-panel 1A

The Sub-panel worked on the following subjects:

- Packet Telemetry Services pink sheets review
- Telecommand Data Routing pink sheets review
- Telecommand Data Management pink sheets review
- AOS Network and Data Links pink sheets review
- Command Operations Procedures COP1 pink sheets review
- Time Code Formats pink sheets
- Restructured Red Books
- Overview of Space Link Protocols Green Book
- Application Profiles
- Proximity-1 (COP-P)

## 2. State of activities (2)

- Sub-panel 1B

The Sub-panel worked on the following subjects:

- Telemetry Channel Coding pink sheets review
- Channel Coding Green Book
- Co-ordination with P1A for Restructured Coding Book
- Co-ordination with P1E on 8-PSK Trellis Coded Modulation

## 2. State of activities (3)

- Sub-panel 1C

The Sub-panel worked on the following subject:

- Image Lossy Data Compression

## 2. State of activities (4)

- Sub-panel 1E

The Sub-panel mainly worked on the following subject:

- Bandwidth Efficient Modulation: Review of Red Recommendations 3.3.5A, 3.3.5B, 3.3.6

## 2. State of activities (5)

- Sub-panel 1F

The Sub-panel worked mainly on the following subject:

- File Delivery Protocol (CFDP) Red Book Review

## 2. State of activities (6)

- Sub-panel 1J

The Sub-panel worked on the following subjects:

- Recommendation for Orbit Data Messages
- Green Book on Navigation Definitions and Conventions
- Tracking Data Interface

## 2. State of activities (7)

- Sub-panel 1K

The Sub-panel worked on the following subjects:

- White Book including SOIF Reference Model and Implementation Model
- Timing Service (co-ordination with P1J to identify the applications needs)

### 3. Resolutions(1)

- **Related to Sub-panel 1A:**
- Panel 1A resolves to request the CCSDS management council to approve the release of the following Pink Sheets as CCSDS Blue Books contingent on inclusion of changes\* based upon RIDS approved by Panel 1A during the Spring 2001 Meeting:
  - Packet Telemetry Services, CCSDS 103.0-P-1.1
  - Telecommand Part 2: Data Routing CCSDS 202.0-P-2.1 \*
  - Telecommand Part 3: Data Management CCSDS 203.0-P1.1
  - AOS, Networks and Data Links Pink Sheets CCSDS 701.0-P2.1
  - Command Operations Procedure, COP-1, CCSDS 232.1 \*

### 3. Resolutions(2)

- **Related to Sub-panel 1B:**
- P1B resolves to request the Management Council to upgrade the Telemetry Channel Coding Pink Sheets to Blue status
- P1B resolves to request the Management Council to dedicate the Telemetry Channel Coding Blue Book to the memory of Warner Miller:

*See next page*

## Dedication

- This document is dedicated to the memory of Warner H. Miller of NASA. Warner was a major contributor to CCSDS Recommendations since its inception. He made numerous contributions in such diverse fields as: Error Control Coding, Radio Frequency Modulation, Data Architecture, and Data Compression. A superb technologist, gentleman and friend, Warner was always ready to help, especially young colleagues. His approach to work and life, in general, will be deeply missed by his many friends and colleagues in the CCSDS community.

## 3. Resolutions(3)

- **Related to Sub-panel 1C(1):**  
The Sub-panel took the following resolutions:
  - Two de-correlators remain as candidates: DWT, MLT
  - Two quantizer/entropy coding schemes remain as candidates: BPE, SQ/RLE
  - Optimisation of DWT+BPE scheme will be explored further: this scheme being the preferred one since it has the potential of meeting all CCSDS requirement at best
  - Current White Books will be integrated into a single coherent version describing current candidates

### 3. Resolutions(4)

- Related to Sub-panel 1C(2):
- P1C wants to express special appreciation to Warner H. Miller for his vision and effort in initiating standardisation of compression algorithms
- P1C wants to express special appreciation to Willem Wijmans for his contribution in supporting lossy compression standardisation effort. P1C wishes him good luck with his retirement

### 3. Resolutions(5)

- Related to Sub-panel 1E:
- Sub-panel 1E resolves to request the Management Council to approve the introduction into the RF& Modulation Blue Book of

Recommendations 2.4.17A, 2.4.17B and 2.4.18,

on Bandwidth Efficient Modulations, which are the new names proposed for Recommendations respectively 3.3.5A, 3.3.5B, 3.3.6

### 3. Resolutions(6)

- **Related to Sub-panel 1F(1):**

The Sub-panel agreed on the following Resolutions:

R01-05-01:

CCSDS Sub-panel 1F resolves:

- 1) To incorporate the results of all CFDP Red Book RID reviews and discussions into a Draft Blue Book and an accompanying Green Book that:
  - Contain just Core Procedures + Deferred Transmission
  - Move the Extended Procedures ( less Deferred Transmission) into an informative Annex that is frozen to accompany the Blue Book - “a snapshot in time”
  - Clearly notes that these informative Annexes are intended to independently evolve in the future in the context of the IPN “Bundling”development

### 3. Resolutions(7)

- **Related to Sub-panel 1F(2):**

2) To issue this restructured Draft Blue Book and Green Book “quickly” for final Agency review during the summer of 2001. The nominal plan will be to go “Blue” at the next meeting in November

3) That, if any Agency has a compelling need for the Book to go Blue sooner than November 2001, then they should petition the Management Council for an accelerated review process. In the event that this occurs, then Sub-panel 1F will if necessary convene either physically or virtually to effect the transition to Blue

4) To evolve the CFDP protocol as part of the new IPN “Bundling”concept

### 3. Resolutions(8)

- **Related to Sub-panel 1F(3):**  
R01-05-02:  
CCSDS Sub-panel 1F resolves to recommend to the TSG that it should convene a special Test Bed Workshop in the fall of 2001, containing representatives from all key Panels and Sub-panels. Such a workshop should:
  - Identify needs and configurations
  - Identify possibilities for confederating current Agency assets
  - Set up a roadmap and plan for initial prototyping opportunities

### 3. Resolutions(9)

- **Related to Sub-panel 1F(4):**  
R01-05-03:  
CCSDS Sub-panel 1F resolves to thank its hosts,NASA and the Jet Propulsion Laboratory, for the excellent hosting arrangement and cordial environment that was afforded for this meeting

### 3. Resolutions(10)

- Related to Sub-panel 1J

RESOLUTION 1:

P1J resolves that the draft Recommendation for Orbit Data Messages (CCSDS 502.0) is sufficiently mature to undergo review by the CCSDS Agencies. P1J therefore requests that the Management Council approve this document as a CCSDS Red Book and release it for Agency review.

RESOLUTION 2:

P1J resolves to request that the Management Council approve publication of the report on Navigation Definitions and Conventions (CCSDS 500.0) as an issue-1 Green Book and release it in conjunction with the review of the Orbit Data Messages Red Book.

### 3. Resolutions(11)

- Related to Sub-panel 1K

No specific resolution

### 3. Resolutions(12)

- **Related to Panel1 Plenary**
  - 1) Panel1 concurs with all Resolutions of its Sub-panels
  - 2) Panel1 resolves to thank NASA and JPL for the excellent organisation and hosting arrangements of CCSDS Panel fall 2001 meetings at Pasadena
  - 3) Panel1 resolves to request the Management Council to approve the nomination of Patrick Plancke, ESA/ESTEC, as new chairman of Sub-panel1K in replacement of Damien Maeusli, ESA/ESTEC
  - 4) Panel1 resolves to thank Damien Maeusli for its excellent contribution to CCSDS as Chairman of Sub-panel1K and to wish him success in his new function at ESA

### 4. Considerations for MC(1)

- **Related to Sub-panel 1A(1) :**
  - 1) The following documents are proposed for Agency review:
    - Pink Sheets containing a change to increase the resolution of the non-segmented time code format within the Time Code Formats Blue Book, shall be sent out for Agency Review as Pink Sheets.

#### 4. Considerations for MC(2)

- **Related to Sub-panel 1A (2):**
- The 7 restructured red books below have been reviewed by Panel 1A and are ready for Agency Review:
  - Channel Coding & Synchronization, Part 1 Synchronous (CCSDS 131.0-R1)
  - Channel Coding & Synchronization, Part 2 Asynchronous (CCSDS 231.0-R1)
  - TM Space Data Link Protocol, (CCSDS 132.0-R1)
  - Space Packet Protocol, (CCSDS 133.0-R-1)
  - TC Space Link Protocol, (CCSDS 232.0-R1)
  - Command Operations Procedure-1, (CCSDS 232.1-R1)

#### 4. Considerations for MC(3)

- **Related to Sub-panel 1A (3):**
- Release “Overview of Space Link Protocols” as a Green Book for Agency Review, CCSDS 130.0-G-0.3, December 2000.
- Space Link Identifiers Red Book (although out for Agency Review) still requires adequate review by some member agencies

2) As a result of the discussion on Proximity-1 within the sub-panel, it was decided that Prox-1 will remain within the sub-panel for further detailed specification (COP-P) clean-up and review.

Prox-1 Blue Book release either Fall 2001 or Spring 2002

## 4. Considerations for MC(4)

- Related to Sub-panel 1E:
  - P1E PROPOSES TO CREATE A GREEN BOOK (CCSDS 413.0-G-1) IN SUPPORT TO THE 3 RECOMMENDATIONS ON BANDWIDTH-EFFICIENT MODULATIONS
  - P1E PROPOSES TO CREATE A YELLOW BOOK (CCSDS B20.0-Y-2) CONTAINING THE PROCEEDINGS OF P1E PERTAINING WITH BANDWIDTH-EFFICIENT MODULATIONS

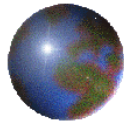
## 4. Considerations for MC(5)

- General
- Application Profiles: Actions to be defined to proceed further:
  - Definition of template(s)
  - Profiles to be recommended by CCSDS for given type of missions
  - CCSDS qualified systems(?)
- Working group for system co-ordination across the layer
- Generalisation of test bed for all Panels

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**Attachment K**

**Panel 2 Report**



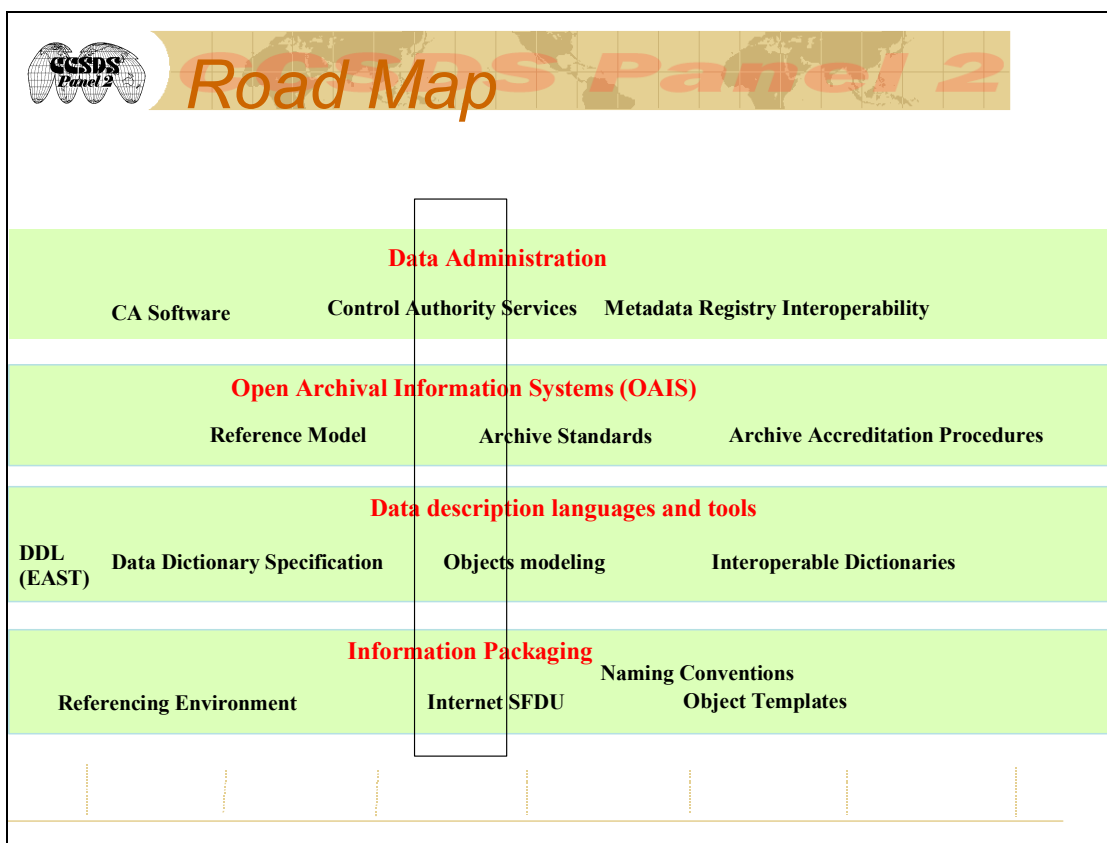
## *Panel 2 Report to Management Council June 6<sup>th</sup> 2001*

D Giaretta



### *Report Structure*

- ✚ Status of activities
  - ▣ Workplan
  - ▣ Document Tree/ Status
  - ▣ Organisation
- ✚ Work Progress
  - ▣ Actual production of documents
  - ▣ Accomplishments
  - ▣ Meetings
- ✚ Resolutions
- ✚ Conclusions/Issues



**CCSDS Panel 2 Workplan**

Research	Development	Deployment
<b>Requirements</b>	<b>Languages</b>	<b>Software</b>
<ul style="list-style-type: none"> <li>• XML implementation               <ul style="list-style-type: none"> <li>○ DED</li> <li>○ Packaging</li> </ul> </li> <li>• Standard Objects               <ul style="list-style-type: none"> <li>○ Java based applications/ classes</li> </ul> </li> <li>• URN-type services from CAA</li> <li>• Archive services               <ul style="list-style-type: none"> <li>○ Certification</li> <li>○ Ingest</li> <li>○ Identification</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• DEDSL               <ul style="list-style-type: none"> <li>○ XML **</li> <li>○ PVL **</li> </ul> </li> <li>• Archive Reference Model **</li> <li>• Ingest</li> <li>• XML based Advanced Structures</li> </ul>	<ul style="list-style-type: none"> <li>• EAST support</li> <li>• P2 Promotion</li> <li>• Control Authority services</li> <li>• CA Agent Services</li> <li>• Project usage               <ul style="list-style-type: none"> <li>○ PAE (ESRIN)</li> <li>○ Data migration (GSFC)</li> <li>○ CDPP (CNES)</li> </ul> </li> <li>• OAIS workshops</li> <li>• External Project usage</li> </ul>



## Organisation Panel 2



## Actual production of books-1

### Data Entity Dictionary Specification Language (DEDSL)

- ✚ DEDSL Abstract Syntax – will be requested to go Blue
- ✚ DEDSL PVL Syntax – will be requested to go Blue
- ✚ DEDSL XML/DTD Syntax - to CCSDS editor as Red Book – ask for 3 months review from 1<sup>st</sup> July
  - ▣ Final RID on definition of Conformance resolved
    - “Base Conformance” and “Interoperability Conformance” in the Abstract Syntax
    - “Notation Conformance” and “Interoperability Conformance” in Concrete Syntax
  - ▣ Want a parallel review in ISO (6 months review)
  - ▣ Will also contact W3C to put document on W3C/XML pages as a note



## *Actual production of books-2*

### **OAIS Ref. Model**

- ✚ ISO DIS review and Agency Red Book review
  - ✚ Ended November 15<sup>th</sup>
  - ✚ Changes required to clarify “PRESERVATION PLANNING” function - show as separate entity in Functional Model - mostly just reorganisation of material
- ✚ Plan to have a CCSDS and ISO FDIS 2 month review starting June 2001.
  - ✚ No Technical comments allowed in FDIS review
- ✚ Assuming only minimal delays this should produce an FDIS in Sept 2001



## *Actual production of books-3*

- ✚ PVL Tutorial - Green Book – going to CCSDS editor
- ✚ Unique Identification – Yellow Book awaiting publication
- ✚ PVL pink sheets going to ISO



## Proposed Resolutions

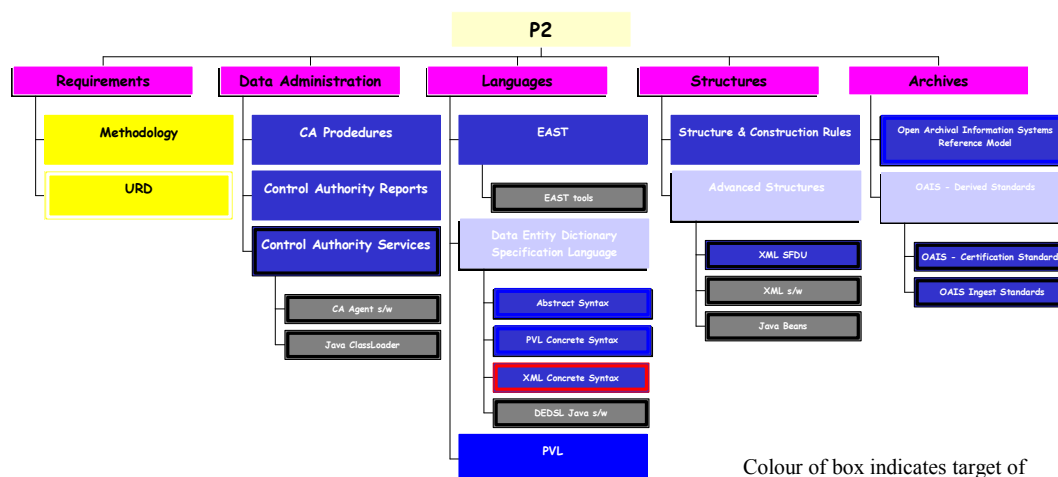
### The Management Council resolves to publish:

- ✚ The DEDSL Abstract Syntax as a Blue Book
- ✚ The DEDSL PVL Concrete Syntax as a Blue Book
- ✚ The DEDSL XML/DTD Concrete Syntax as a Red Book for 3 months review from 1<sup>st</sup> July, with a 6 month parallel review in ISO
- ✚ The OAIS Red-2 for a 2 month review with a parallel ISO FDIS 2 month review and subsequently as a Blue Book and ISO IS

The PVL Pink sheets will be submitted to ISO



## Document Tree/Status



Colour of box indicates target of book (yellow/blue/green etc). Gray indicates software.

Border denotes state e.g. red/white. Black indicates work in progress

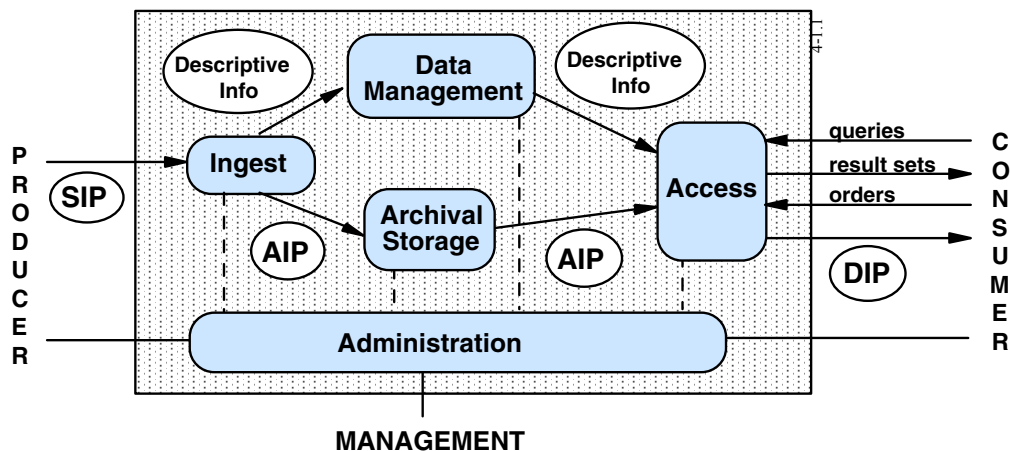


## Meetings held/planned

- ✚ Bi-Monthly telecons normally held
- ✚ Propose XML Technical Workshop at GSFC in the week starting August 20<sup>th</sup> – all panels invited
- ✚ Fall 2001 meeting planned: CNES
  - 22-31 Oct

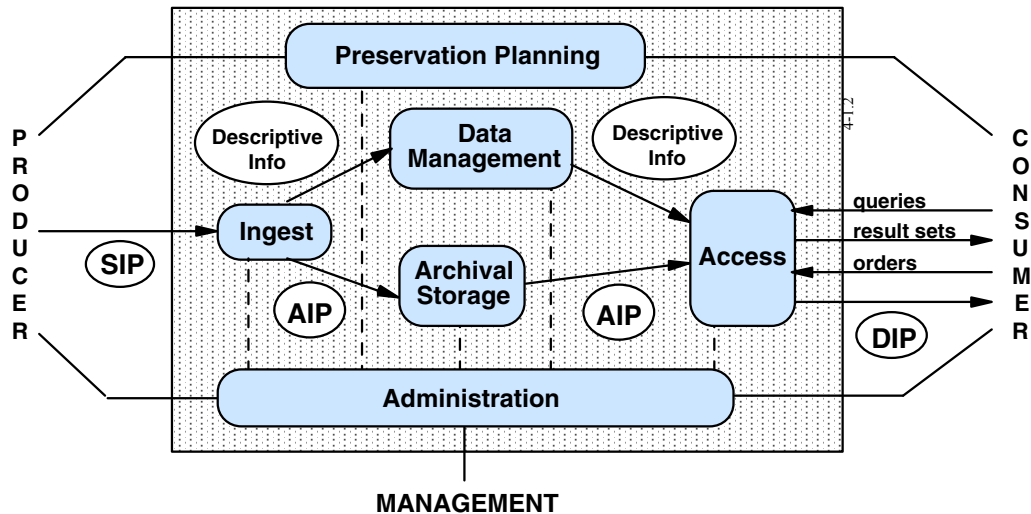


## Current OAIS Functional Model





## Revised OAIS Functional Model



## Project Usage Panel 2

[See following six slides.]

# REPORT OF THE MANAGEMENT COUNCIL--MEETING MINUTES

## NASA

(An exhaustive list would require substantial additional investigation)

Project/Facility	Implemented /Planned	ASCII English	PVL	SFDU Packaging	Control Authority
Data Distribution Facility	I	✓	✓	✓	✓
NSSDC	I	✓	✓	✓	✓
AMMOS	I	N/A	✓	✓	N/A
JPL/Planetary Data System	I	N/A	✓	✓	N/A
NSSDC Control Authority	I	✓	✓	✓	✓
UARS Control Authority	I	✓	N/A	✓	✓
JPL Control Authority (currently inactive)	I	✓	✓	✓	✓

Project/Facility	Implemented /Planned	ASCII English	PVL	SFDU Packaging	Control Authority
GOES	I	✓	✓	✓	✓
ISTP/GEOTAIL	I	✓	✓	✓	✓
ISTP/WIND	I	✓	✓	✓	✓
ISTP/POLAR	I	✓	✓	✓	✓
ISTP/CLEMENTINE	I	N/A	✓	✓	✓
ISTP/INTERBALL	I	✓	✓	✓	✓
ISTP/FAST	I	N/A	✓	✓	✓
ISTP/EQUATOR-S	I	N/A	✓	✓	✓
UARS	I	✓	N/A	✓	✓
SOHO	I	✓	✓	✓	✓
SAN MARCO	I	✓	✓	✓	✓
Dynamics Explorer	I	✓	N/A	✓	✓
Pioneer 10/11	I	✓	N/A	✓	✓

Project/Facility	Implemented /Planned	ASCII English	PVL	SFDU Packaging	Control Authority
Halley Watch CD-ROMs	I	✓	✓	✓	✓
IMP 8	I	✓	✓	✓	✓
ISEE	I	✓	N/A	✓	✓
GSFC PACOR II	I	✓	✓	✓	✓
HST	I	N/A	✓	✓	✓
SCATHA	I	✓	✓	✓	✓
SMM	I	✓	N/A	✓	✓
IMAGE	I	N/A	✓	✓	✓

Some data objects conform to a draft version of the SFDU Recommendation.  
Data and description from a few instruments only.

#### ESA

Project	Implemented /Planned	ASCII English	PVL	SFDU Packaging	Control Authority
EURECA	I	N/A	N/A	✓	N/A
Cluster / Phoenix	I	✓	✓	✓	✓
Huygens	P	✓	✓	✓	✓
XMM	P	✓	✓	✓	✓

**CNES**

<b>Project</b>	<b>Implemented /Planned</b>	<b>ASCII English</b>	<b>PVL</b>	<b>SFDU Packaging</b>	<b>Control Authority</b>
Science Data Management Services (Archival/Distribution)	P	N/A	N/A	✓	✓
CST Control Authority (Toulouse Space Centre)	P	✓	N/A	✓	✓
MARS96	P	✓	N/A	✓	✓
Swedish Viking Archive	I	N/A	N/A	✓	✓
ISEE 1-2 Archive	P	N/A	N/A	✓	✓

<b>Project</b>	<b>Implemented /Planned</b>	<b>ASCII English</b>	<b>PVL</b>	<b>SFDU Packaging</b>	<b>Control Authority</b>
PHOBOS Archive	P	N/A	N/A	✓	✓

**BNSC**

<b>Project</b>	<b>Implemented /Planned</b>	<b>ASCII English</b>	<b>PVL</b>	<b>SFDU Packaging</b>	<b>Control Authority</b>
Cluster / Phoenix	P	✓	✓	✓	N/A
Solar Terrestrial Physics Data Facility	I	✓	✓	✓	N/A



## Accomplishments

### OAIS

- OAIS Reference Model very successful
  - Being used by many projects (Nedlib, CEDARS, Inter-PARES, CDPP, SIPAD, NSSDC, British Library, Royal Library of the Netherlands (RLN), San Diego Supercomputer Centre...)
  - Being mandated in some Proposal documents (ITT/RFP)
  - IBM implementing OAIS-based system for RLN (£5M project)
- France setting up a working group within ARISTOTE (<http://www.aristote.asso.fr>) – interested in archive digital information, including libraries and Dept of Justice.
  - “astonishing unifying role”
- OAIS likely to be used by International Council for Scientific Unions (ICSU) as basis for study on long-term preservation



## Accomplishments-2

### Software

- CDPP (CNES)
- EAST tools being made freely available – for many operating systems (<http://logiciels.cnes.fr>)
- Prototypes for XML tools being developed for DEDSL, Packaging etc



## *EAST usage at ESRIN*

Archive Management System (AMS)

- also uses PVL



## *Use of EAST in projects at CNES*

**SIPAD** : includes **ARCAD**, **VICKING**, **PHOBOS**, **INTERBALL...**

**SSALTO** : Altimetry data (**TOPEX**, **JASON...**)  
and Spacecraft location (**DORIS**)

Data description

Data extraction(new tool based on interpreter)

Data writing (new tool based on generator)

### **EARTH\_OBSERVATION :**

Description of **SPOT** images metadata

Preliminary studies on **SR\_6\_10** interfaces standard

**MICRO SATELLITES** : Definition of telemetry and products  
(**ETHER**, **DEMETER**, **PICARD**, **COROT....**)



## SFDU Accomplishments

### ✚ SFDU usage

- ✚ At GSFC/NSSDC for major migration task
- ✚ SSALTO project at CNES
- ✚ Cluster II (ESA)
- ✚ XMM (ESA)



## OAIS Accomplishments

### ✚ OAIS

- ✚ OAIS Reference Model very successful
  - Being used by many projects (Nedlib, CEDARS, Inter-PARES, CDP, SIPAD, NSSDC, British Library, Royal Library of the Netherlands (RLN), San Diego Supercomputer Centre...)
  - Being mandated in some Proposal documents (ITT/RFP)
  - IBM implementing OAIS-based system for RLN (£5M project)
- ✚ Interactions with OMG



## Accomplishments-2

### Software

#### EAST

- Increasing usage by Projects
- tools being made freely available – for many operating systems (<http://logiciels.cnes.fr>)
  - Solaris
  - NT
  - Linux

- Prototypes for XML tools being developed for DEDSL, Packaging etc



## New/Ongoing Work

### OAIS – next steps

- INGEST standards – draft being prepared by CNES
- Software Preservation techniques
  - Emulation of hardware techniques have been proposed to us
- Mission Archives
  - Reviews in agencies of existing archives
- Certification/Best Practice
  - NARA seeking resources to lead this activity

### Languages

- DEDSL-XML/Schema – await complete overall XML review



## XML

- ✚ XML-related work – re-engineering and extending P2 work
  - ▣ XML/JAVA based packaging
  - ▣ Standard Objects
- ✚ XML technical workshop planned for week beginning 20<sup>th</sup> August at GSFC
  - ▣ Other Panels invited – parallel sessions possible
  - ▣ Could develop into useful exchange of requirements
    - Capture domain expertise
      - Dictionaries
      - Essential metadata e.g. CFDP
    - Use of XML and XSLT helps to remove “religious” arguments



## Step 1

- ✚ Register CCSDS Namespace
- ✚ Identify that set of XML-related work which is
  - ▣ standardised XML
  - ▣ software support in the XML-world either commercial or University based



## Step 2

- ✱ Using Step 1, build an initial pure-XML data packaging structure using e.g.
  - ✱ Schema
  - ✱ RDF/ XLink
  - ✱ Mime-types



## Step 3

- ✱ Provide some prototype support/application software e.g. using JAVA, Web-based CA
  - ✱ part one – pure XML where one should be able to avoid producing ANY specific code other than for example XSLT – in order to display info
    - could include XML/DTD DEDSL
  - OR
  - Do NOT use DEDSL and instead use XML schema
  - ✱ part two – involve binary data, with complex descriptions e.g. EAST, EAST interpreter, full DEDSL(?)
  - ✱ part three: review from step 1
  - ✱ part four – sell the idea



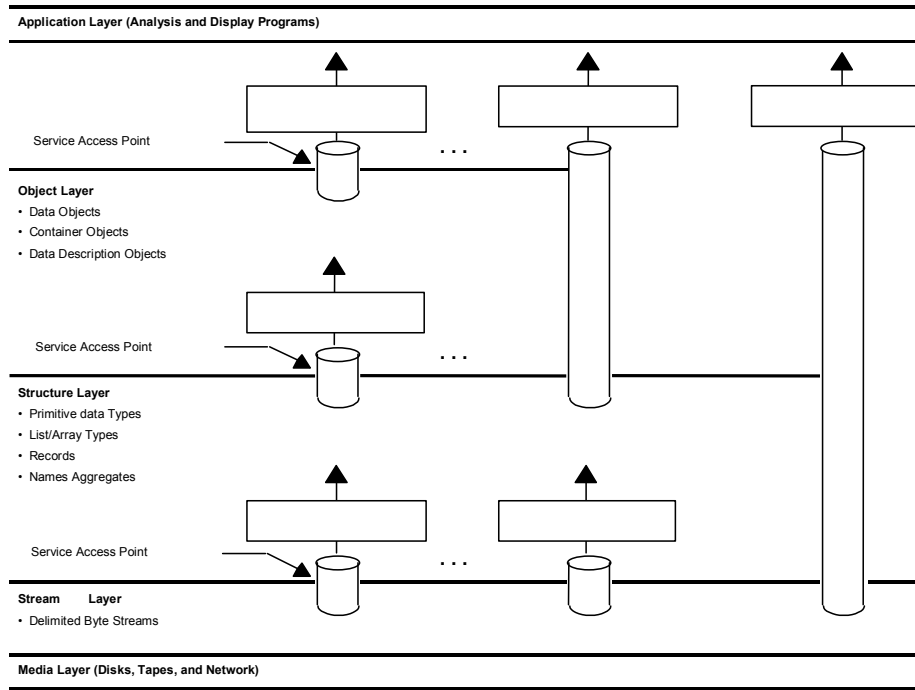
## Step 4

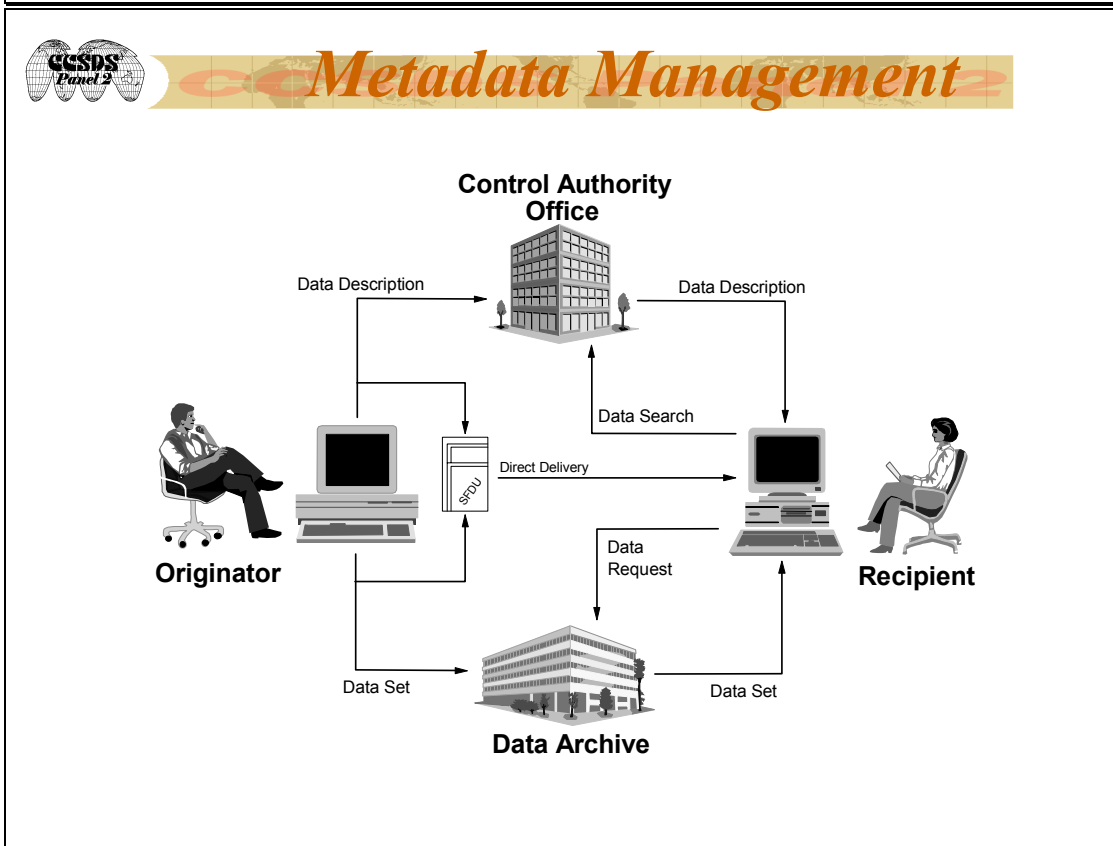
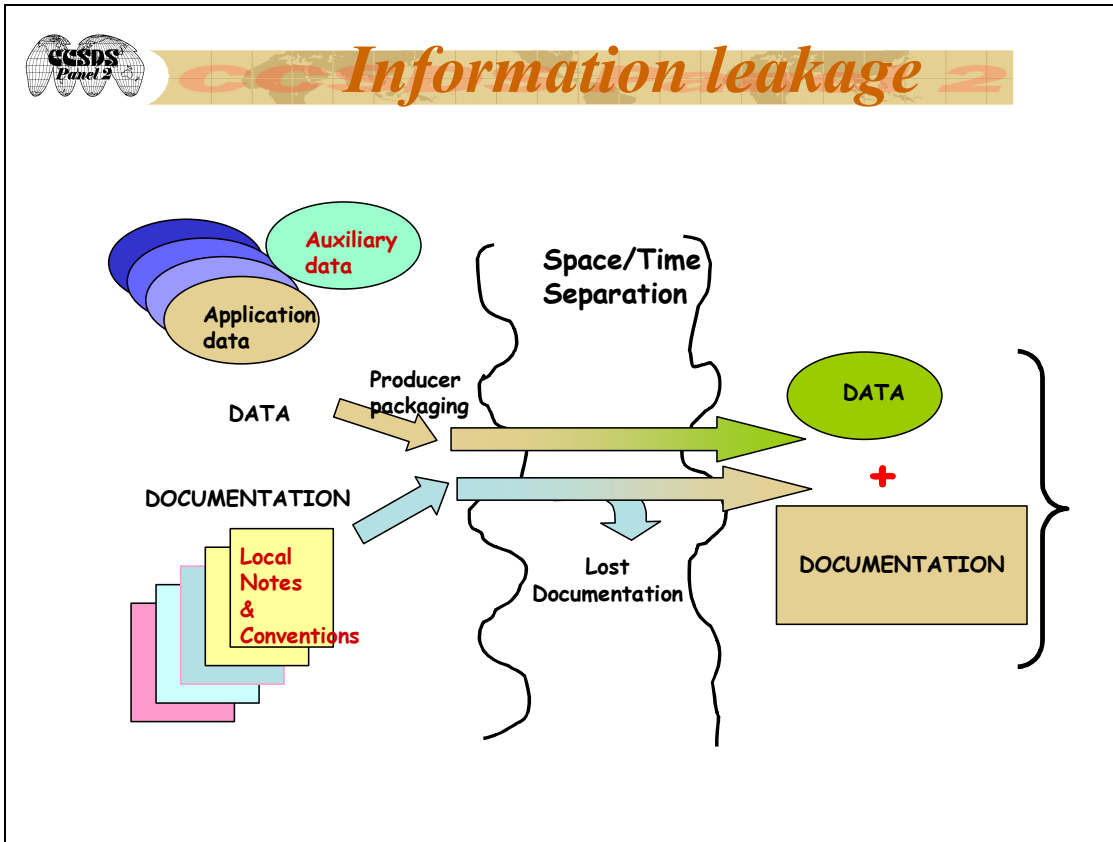
### Identify the killer-app

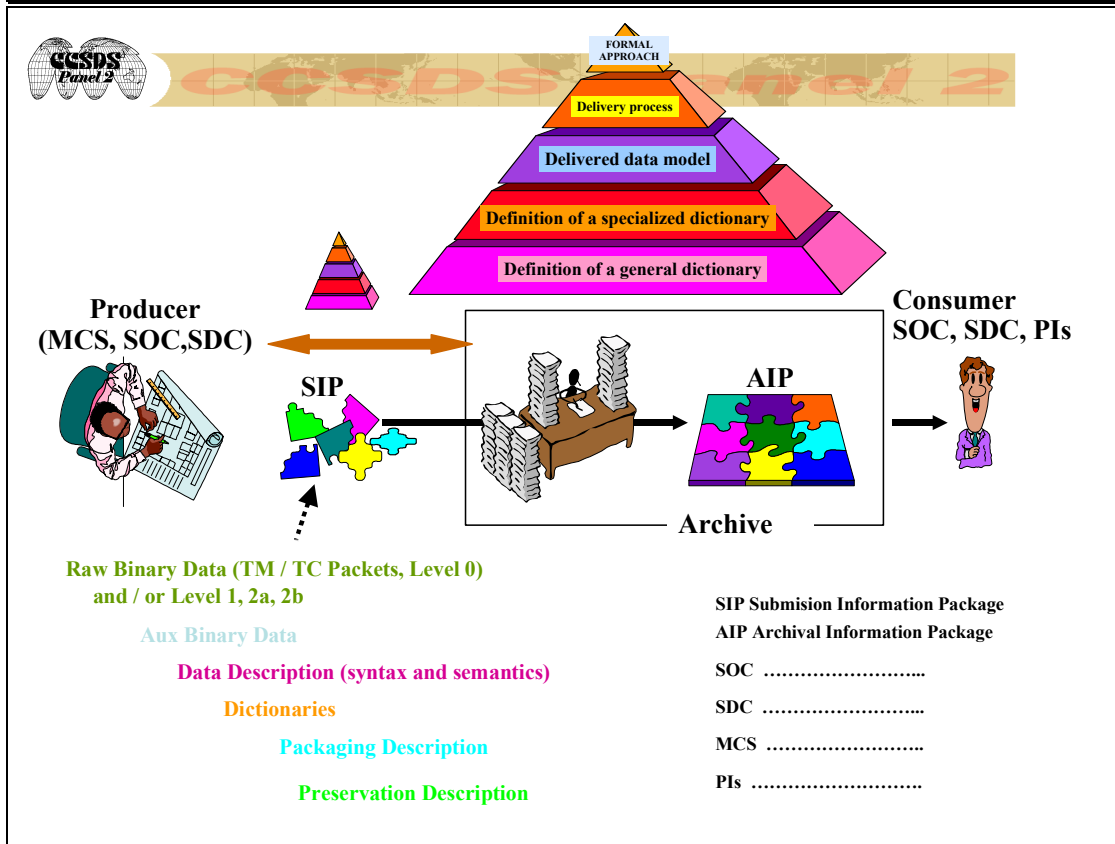
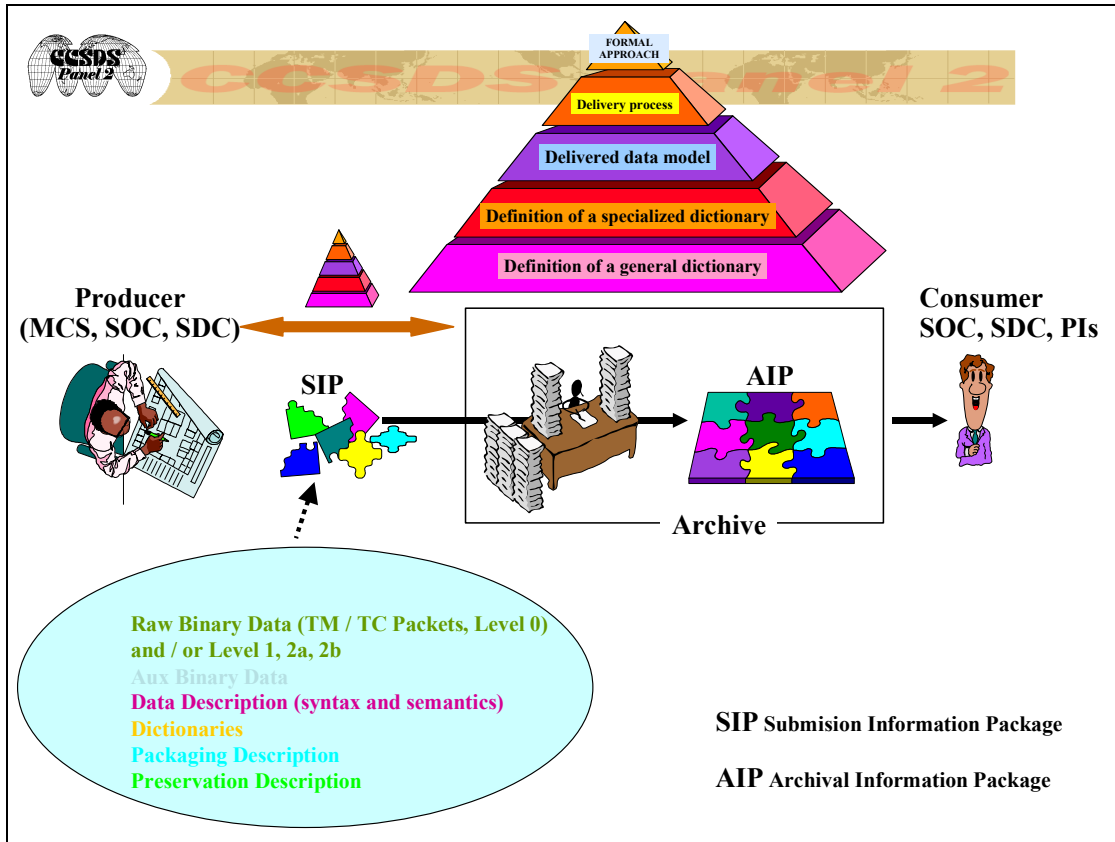
- identify missing component s/w
  - could be interface definitions for scientific apps
- provide s/w where necessary/desirable
- Test
- document in the form of one or more Standard
- iterate from step 1



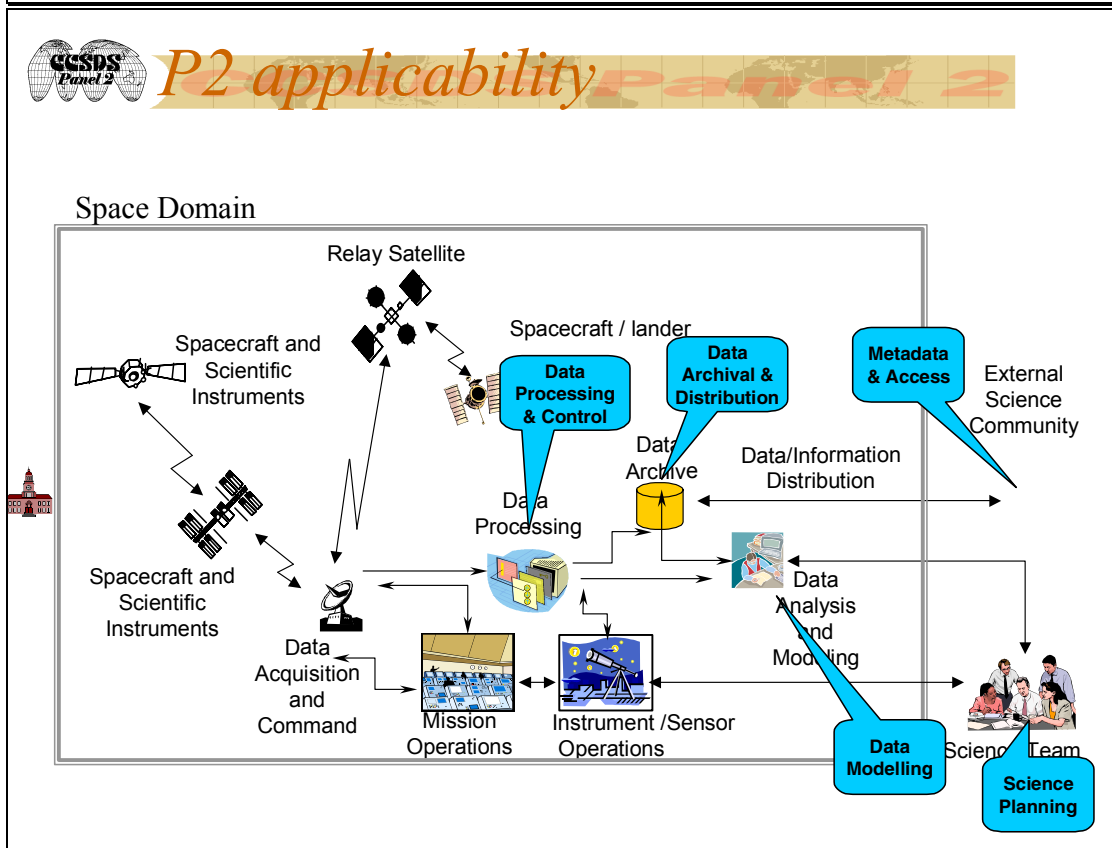
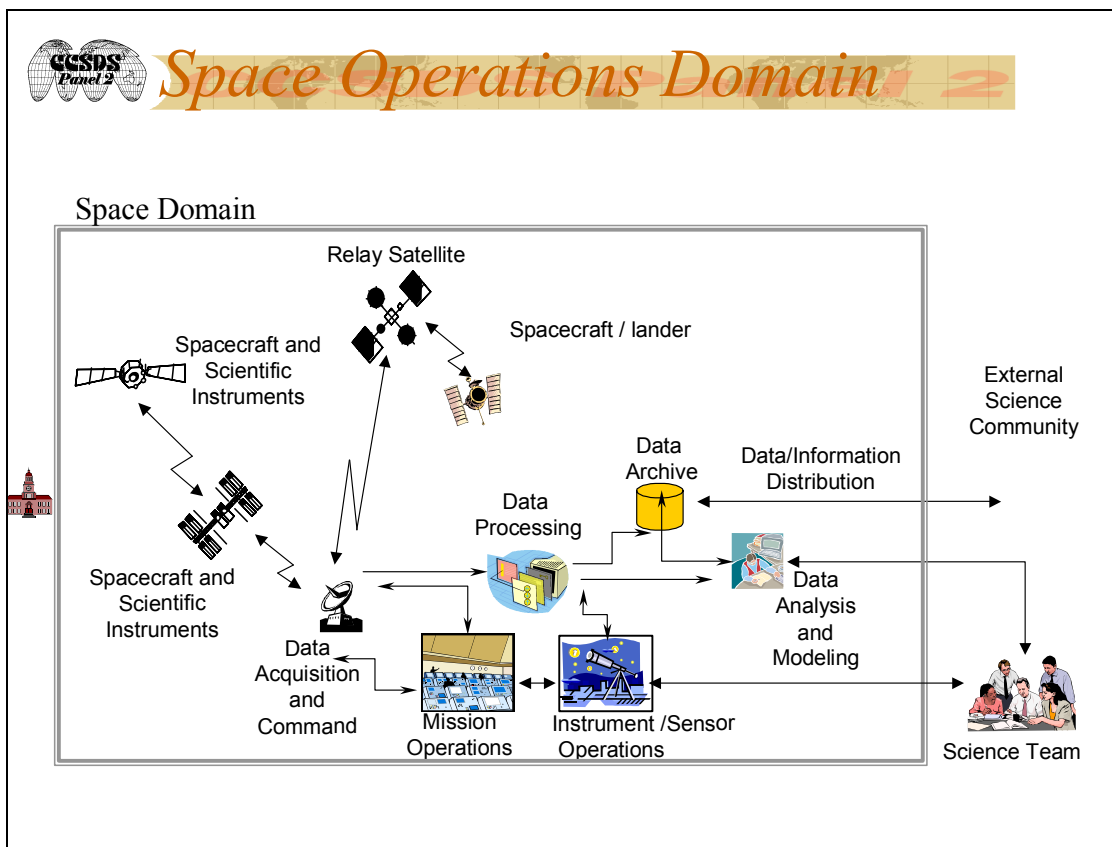
## Information Layers

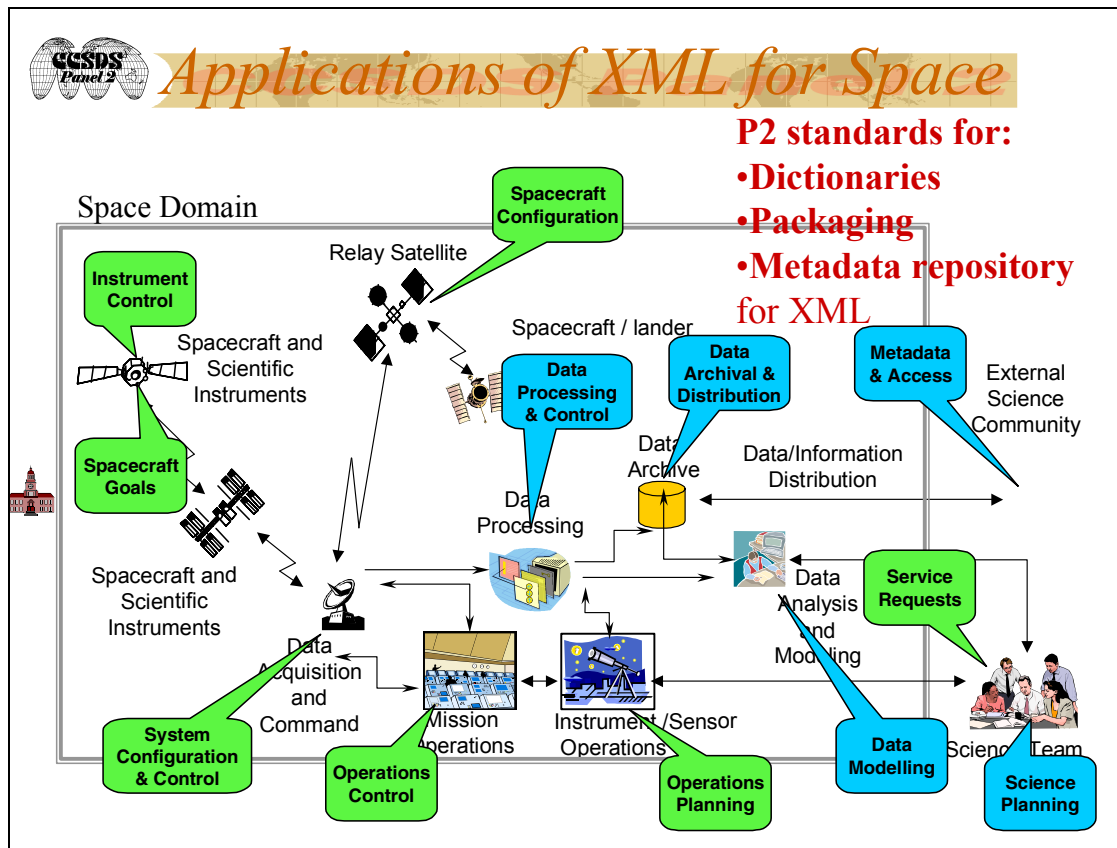












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**Attachment L**

**Panel 3 Report**

## 1. P3 ACTIVITIES STATUS

### **EMPHASIS on the development of recommendation** for :

Development of SLE transfer Services recommendation (according to MC-F00-17 resolution)

- RAF
- RCF
- CLTU
- FSP similar to RCF

Development of SLE API recommendations for the implementation of SLE services over existing Telecommunication systems (TCP/IP, ) (according to MC -F00-18 resolution).

Development of SLE Service Management books

### **Transfer Service books production**

Return All Frames (911.1-R-2)

- > review completed in February 2001 ( ~137 RIDs)
- > RIDs disposition achieved in March 2001
- > should be blue after June WorkShop

Return Channel Frames RCF (911.2-R-1.7) September 1999 -

- > consistency with RAF is performed
- > ready to be sent to the secretariat for R-2 publication next Fall

Consolidated Return Services Specification (911-D-2) June 2000

- > under P3 internal review

Forward CLTU Service (912.1-R-2) September 2000

- > was updated in March 2001 with applicable RAF R-2 review RIDs.
- > should be blue after June WorkShop

Forward Space Packet (912.3-R-1.9.2) July 1999

- > New issue for blue next Fall
- > Due to the dependence of RAF and CLTU, release of Issue 2 Red Book was delayed until review of RAF and CLTU Red-2 could be completed.

### **Development of SLE API**

A first set of the various White books will be available for the P3 next workshop in June 2001

The books developed are the following :

- SLE API Core
- SLE API Proxies (the initial version will only specify a single Proxy, the one for TCP/IP)
- SLE API Concepts (to become the Green Book)
- SLE API Return Services Supplements (the initial version will only specify the RAF and RCF supplements)
- SLE API Forward Services Supplements (the initial version will only specify the CLTU and FSP supplements)

### **Service Management 910.5**

R1 book Agency Review ended in July 2000

About 400 RIDs transmitted

Internal WG1 activities to take into account these comments

Formal RIDs answers

<sup>1</sup>Report P3 CNES Oxford MC.DOC

Splitting of the companion documents (of the SLE Service Management Red Book) is as follows :

- SLE Brochure (\*)
- SLE Executive Summary (\*)
- Concept Green Book (\*)
- SLE SM RF Characteristics Red Book (\*)
- SLE SM Authentication
- SLE SM Implementation Mapping Rules
- Formal SLE SM MO Descriptions

New release (R-2) should be available after June WorkShop (with companions marked with (\*\*))

## **2. CNES PARTICIPATION**

CNES provides the chairmanship for Panel3 and participates in the various working groups ( 1, 2/3)

CNES participated to the WG 1 meetings in Greenbelt (March)

CNES review the R-2 issue of the RAF document

<sup>1</sup>Report P3 CNES Oxford MC.DOC

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## **Attachment M**

### **TSG Report**



**TSG**  
**Chairman Report**  
**to**  
**CCSDS Management Council**  
**Oxford**  
**June 2001**

M. Drexler DLR-GSOC

June 6 / 7 , 2001

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**TSG Status Report**  
**Content**

- Panel Status
- Operations Plan
- Architecture
- Technical Work Items
  - OMG
  - Security
  - XML
  - Profiles
  - Document control table
- 20<sup>th</sup> Anniversary
- Fall 2001 meetings

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## TSG Status Report Panel 1A



- Resolution: Pink sheets to be released as BBs by MC
  - AOS networks and data links CCSDS 701.0-P-2.1
  - Packet telemetry services CCSDS 103.0-P-2.1
  - Telecommand part 2: data routing service CCSDS 202.0-P-2.1
  - Telecommand part 3: data management service CCSDS 203.0-P-1.1
  - COP 1 CCSDS 232.1
- Restructured RBs ready for agency review
  - Channel Coding & Synchronization, Part 1 Synchronous CCSDS 131.0-R1
  - Channel Coding & Synchronization, Part 2 Asynchronous CCSDS 231.0-R1
  - TM Space Data Link Protocol, CCSDS 132.0-R1
  - TC Space Data Link, CCSDS 232.0-R-1
  - Space Packet Protocol, CCSDS 133.0-R-1
  - AOS Space Link Data Link, CCSDS 732.0-R-1
  - Command Operations Procedure-1, CCSDS 232.1-R1
- Space link identifier doc.: missing agency reviews forces delay
- Segmented time code approved as pink sheets to the Time code BB 301.0-P-2.1
- Overview of Space link Protocols GB for agency 'review' CCSDS 130.0-G-0.3
- Issue: coupled non-coherent ranging optimisation involves 1A, 1E, 1J

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## TSG Status Report Panel 1B, C



### P1B

- Resolution: Telemetry Channel Coding pink sheets shall be approved as BBs by MC
- Channel coding GBs to be produced
- Restructuring coding books: to be finalized: Yamada, Gannett (1A + 1B)
- Frame length issue in AOS result in possible pink sheet process (1A + 1B)
- Research work on new bandwidth efficient codes: Continue investigations on Codes (Punctured CCSDS turbo, product, low density parity check, circular recursive systematic, etc )

### P1C

- Resolutions on lossy image data compression
  - Decorrelators DWT, MLT remain as candidates
  - Quantizer: BPE, SQ/RLE remain as candidates
  - Optimisation of DWT + BPE scheme to be explored further
  - Integrate current WBs into a single coherent version
- Liaison with ISO SC29 W1 JPEG2000 committee
- Schedule: Integrate WBs into single WB until Oct. 2001, RB Issue 1 Jan 2002

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## TSG Status Report Panel 1E



- Resolution : three recommendations on Bandwidth Efficient Modulation RBs approved by agency review for BB inclusion to MC
- Preparation of GB containing technical description and performance data
- Planned: generation of a YB including all relevant input papers. To be clarified: YB only for management material, should be GB
- SFCG issue: A.I. on PIE chair to identify a person to take care of MC-F00-29 (allocation of deep space frequencies)
- Patent Issue for FQPSK-B worked
- Two new activities planned in future:
  - 63 GHz Ka band
  - high telecommand data rates up to 1Mbps

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## TSG Status Report Panel 1F



- Resolution:
  - with CFDP RID review results: to produce draft BB and GB
    - final agency review in Summer
    - CFDP part of IPN Bundling concept
  - Recommended to TSG: Testbed WS in fall
    - TSG confirmed. A.I. Hooke / Carper to invite all panels on basis of a t.b.d. agenda
- Core CFDP as 'Zero'-Bundling Concept, extended procedures in annex, not part of a future BB. Recommendation of going BB at next meeting after final agency review in summer. GB accompanying.
- CFDP Interoperability Tests in Pasadena: 94 tests done highly successful
- Implementation and testing issue:
  - essential for 'incubation' cycle
  - NASA plans: Integrated test bed until fall
  - Use of STRV test plans and STRV engineering model discussed
- A.I. Ops plan theme 4, subtask 4,5 and Theme 1, subtask 6 to be analysed / harmonized

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## TSG Status Report Panel 1J



- Resolutions from Darmstadt meeting:
  - Orbit Data Messages Book (CCSDS 502.0) asked to be release as RB and to initiate agency review
  - Additionally the Navigation Definition and Conventions (CCSDS 500.0) shall be released as GB. Remark: explicit review of GB to be required?
- CCSDS 502.0: formats are planned for ROSETTA and Mars Express support (ICD will be written). Test to verify proper exchange of data planned (ESOC / JPL and P1J navigation workshop in Darmstadt)
- P1J/K: Time
  - Discussed in Darmstadt
  - Meeting in Pasadena: A.I. on P1J placed to identify functional requirements on onboard time and navigation data exchange
- Still open: in future to be applied language for format definition... XML. (A.I. P2 / P1J)
- Theme 3, subtask 4 and theme 4, subtask 2: WBS to be generated
- Future work: Recommendations on Tracking, Attitude, Proximity Operations, Environmental Models, Astrodynamic Constants planned. A.I. Work plan to be developed

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## TSG Status Report Panel 1K



- Consolidation of SOIF WB done in Pasadena, WB distribution to wider audience postponed until November
- Preliminary matrix of onboard services produced. A.I.on P2,3 to work with P1K on cross panel support in relevant areas
- A.I.: Cooperation between P1K and SC14 still needs still to be worked. Contact (e.g. participation & presentation at SC14 meeting) needed in order to identify border lines between each works,
- A.I.: a more detailed work plan has to be established including an analysis of the role of HW interfaces in the life cycle of an onboard system, emphasis on cross support issues
- Cooperation between P1K and P1J: meeting in Pasadena: P1J A.I.
- Industry issue: P1K deals very much with industry issues. Industry to be involved not only in reviews. A.I. on P1 chair to report to MC; two issues: CCSDS charter, practical realization
- TSG Request: New Toolbox, beginning 2002 shall not affect matrix definitions

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## TSG Status Report Panel 2



- Resolutions:
  - DEDSL
    - ASN / PVL to be released as BB
    - XML/DTD for RB agency review and parallel ISO review
  - OAIS ready for final agency review in parallel to ISO FDIS review with an FDIS ca. in September
- New Version of EAST tools demonstrated (available on LINUX, NT and Solaris)
- Next steps
  - In OAIS work: Ingest, Certification
  - DEDSL- XML/Schema: await XML review
- XML workshop planned in August at GSFC. A.I.: program to be drafted, other panels to be invited as well as OMG, others ?
- Impact of XML work on work plan to be identified.
- A.I.: Theme2 in Ops plan to be analysed
- A.I.: A set of diagrams shall be generated covering P2 issues, including a typical file transfer scenario

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## TSG Status Report Panel 3

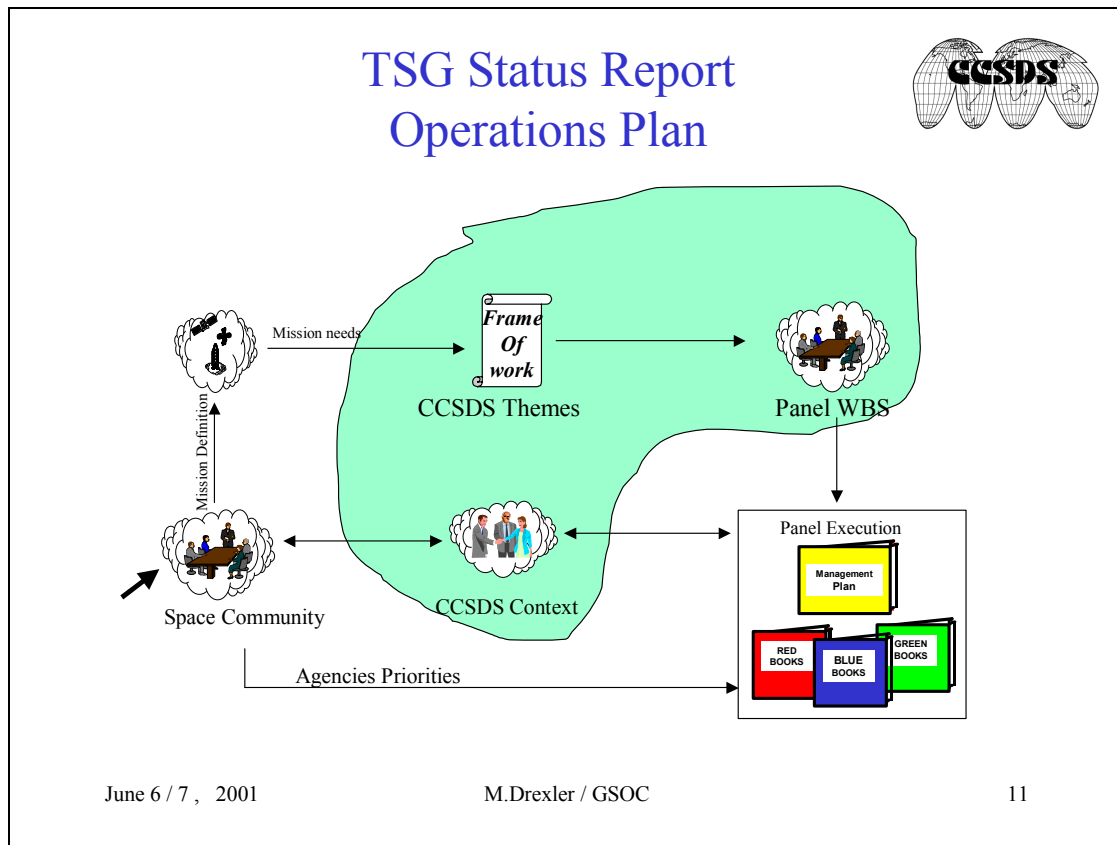


- No P3 attendance at TSG, P3 report done at TSG by G. Lapaian
- MC A.I.s: MC-F00-17 / 18: dates requested by MC were not maintained, deferred to next cycle
- WG1: SLE Service Management (SM) CCSDS910.5-R-1:
  - new release in June, restructured, Contains: SLE brochure, SLE executive summary, Concept GB, SLE SM RB-2, SLE SM RF characteristic RB
- WG2/3: SLE Service Specification:
  - CLTU CCSDS 912.1-R-2, proposal for BB before June
  - RAF CCSDS 911.1-R-2, proposal for BB before June
  - RCF CCSDS 911.2-R-1.7 for RB publication, BB in fall
  - FSP CCSDS 912.3-R-1.9.2 similar to RCF
- WG5:
  - API I/F, API Implementation: WBs for June WS
  - Security: Ground data Security Policy book, etc: security work t.b. integrated in the view of Pasadena Security A.I.s
- Ops plan themes: A.I. to analyse Theme 3 and draft impact on P3 work breakdown
- Language choice for SLE service management implementations: issue for XML WS
- SLE implementations: ESA-JPL tests: RAF, RCF, CLTU available and validated, fully operational for INTEGRAL in October

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## TSG Status Report Operations Plan, Overview Themes Review

- A.I. MC F00-A14: only minor inputs, no reaction from agencies. Inputs received:
  - M. Morlon: P1 WBS update
  - E. Bergamini: Inputs to strategy / context and model
- A review of all themes was done. Major mission support themes addressed in the Ops plan themes not analysed on their impact on panel work packages. A general overview can be given as follows:
  - P1: minor changes to theme 1 and WPs required
  - P2: a more precise breakdown of theme 2 for more precise WP definitions is required
  - P3: theme 3, especially subtask 2 – 6: open. SLE subtask worked, essential mission operations elements not touched until now
  - All panels: Theme 4 too heterogeneous, needs analysis
  - P1K, Theme 5: program needs to be more concrete broken down

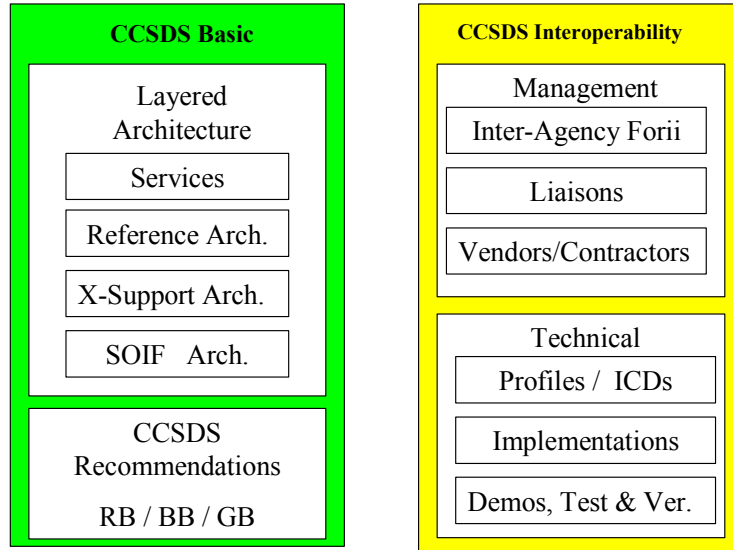
CCSDS

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## TSG Status Report Operations Plan, Context

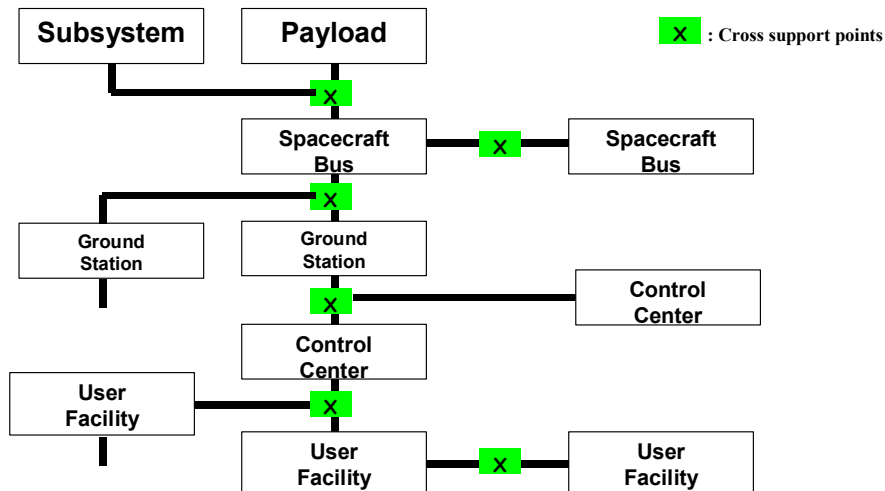


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## TSG Status Report Cross Support Architecture

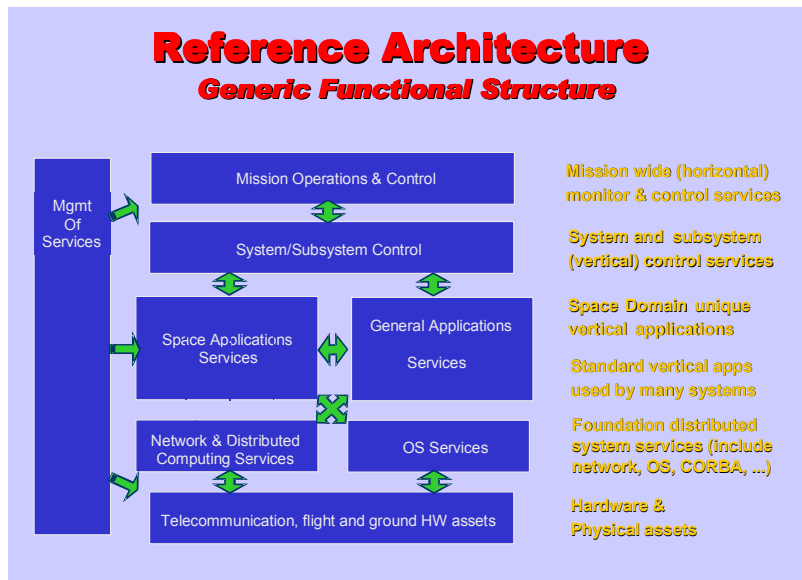


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## TSG Status Report Reference Architecture



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## TSG Status Report Technical Work Items, OMG



- Two presentations were given by P. Shames
  - Liaison with OMG including OMG background overview
  - Reference architecture
- Liaison: Affiliates shall be encouraged by CCSDS members to participate in OMG space DTF. OMG is potential 'seller' for our products. OMG DTF liaison is valid for all panels
- OMG meeting Paris highlights: Ref. Arch. Presented by PS, RFPs formulated (Space Telemetry and Commanding Access Service) by all, OASIS presented by DG
- Reference Model: an end to end system aspect which helps to a better view of our domain. Complements Ops plan theme A.I. of P3

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## TSG Status Report Technical Work Items, Security



- A presentation was given by H. Weiss
- An important and mandatory item to all our products. Reason: security is well recognized in public domain and is a certification issue for all products
- Task reinvigorated: A.I.: all (sub-) panels must take care about security
  - Security must be included in every work program.
  - Security guidance GB to be developed, every (sub-) panel must present its security concept, A.I.s given at TSG to start process
- Proposal: include security review in any review process (WB, RB) as a mandatory review item. MC should not accept books if security not addressed adequately
- HW is willing to support panels and to come to panel meetings if necessary

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## TSG Status Report Technical Work Items, XML



- A.I. MC F00-A03 asked to study languages for operational data
- XML WS in Pasadena, report given to TSG
- W.r.t. A.I. XML was the only focus. Reason:
  - No language is 'the silver bullet', every language needs add-ons / special applications, depending on the data type handled, as e.g. binary data in our space domain, but:
  - XML is widely recognized, commercial support exists and availability of software tools is ensured. This, among other arguments, satisfies the reason to concentrate on XML only, without further research, and:
  - XML can be used in any area in space missions requiring a language for any type of data definition
- Workshops been done, workshops to come in August at GSFC
- P2 lead in CCSDS for language questions
- Question of allocation of XML work: need to be careful to not to concentrate on language questions per se in the CCSDS domain
- Presentation by D. Giaretta on XML after this ....

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## TSG Status Report Technical Work Items, Profiles



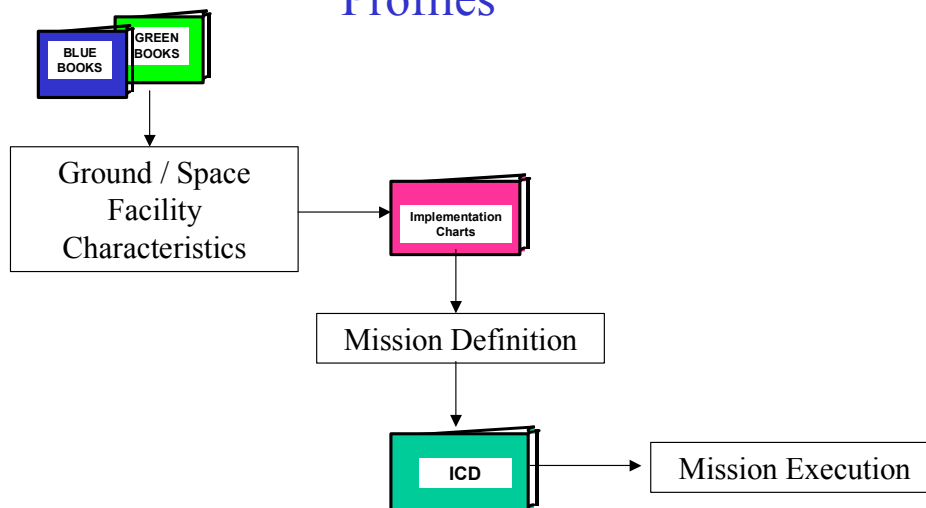
- The need to describe the elements of implemented or to be implemented systems on board and on ground in their use of CCSDS features was already recognized in the early days of CCSDS (see: conformance matrices, etc).
- CCSDS recommendations have normally many options, parameters which must, may or may not be implemented exist. A simple indication to be 'Compliance with CCSDS' therefore does not exist, a 'shopping list' type of declaration is needed
- Solution: supported entities to be documented in a general template describing a 'profile', used as inputs for mission ICDs
- Chance: CCSDS may recommend given profiles for given mission types to further narrowing options and simplify cross-support questions (implemented, preferred and mandatory profiles)
- A template was drafted by Yamada (for space link protocols as first example). A.I. To all (sub-) panels to review in order to complete the template. Yamada then to complete template for review
- Next step, old question: Who will fill the templates: Agencies? an IOAG issue? ..

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## TSG Status Report Technical Work Items, cont. Profiles



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## TSG Status Report Technical Work Items, cont.: Panel Reporting



### A.I. TSG-01-01

Panels to keep to agreed semi-annual structured reporting format in sections as follows:

- Work plan
  - Research Activities
  - Development activities
  - Deployment activities (implementations, tests)
- Road map and present position
- Document tree and document status / history (see: DCT)
- Organisation of (sub-) panel
- Actual Manpower allocations
- Actual Work
  - progress made
  - Active liaisons and external relationships executed
  - 1 – 2 years plan / bar chart
- New Work proposed
- Promotions done
- Accomplishments achieved
- Meetings overview
- Resolutions
- Issues

### Document Control Table DCT

<b>Document Title</b>	TM Space Data Link Protocol
<b>Technical Editor</b>	Takahiro Yamada (ISAS)
<b>Updates/Replaces</b>	Packet Telemetry (CCSDS 102.0-B-5)
<b>Current Version</b>	CCSDS 132.0-W-0.3 (White Book Issue 3)
<b>Proposed Resolution</b>	Publish as Red Book 1 for Agency Review
<b>Current Status</b>	Discussed at P1A on October 18, 2000 and consensus reached Discussed at P1 Plenary on November 28, 2000 and consensus reached
<b>Green Book Status</b>	High-level introduction is contained in 'Overview of Space Link Protocols', CCSDS 130.0-G-1 (a draft is available). A Green Book explaining all Space Data Link Protocols will be edited in 2001.
<b>ISO Status</b>	Will be proposed as Committee Draft at a later time.
<b>Supporting Hardware or Software</b>	This protocol is already used by many missions of the CCSDS Agencies.
<b>Special Comments</b>	This is one of the restructured Panel 1 Recommendations.

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## TSG Status Report 20<sup>th</sup> Anniversary, Overview



- Presentations at SPACEOPS Day in Houston in fall 2002 (Date??)
  - Slot of one day reserved by R. Ivarnez
  - Estimate: more than 15 proposals and abstracts needed until mid August. Selections to be done at fall 2001 meetings, final program to be defined then
  - A.I.s for proposals / abstracts given to CCSDS panels members before and at the Pasadena meeting
  - Recommended: MC to ask agencies to contact manufacturers, implementers for proposals of presentations in their competence of real implementations
  - A selection of themes... see next page ....
- Festive Gathering
  - Who sponsors ? Who organizes ? Where to take place? .... not necessarily in Houston...
  - Dinner Banquet
  - Invited representatives of potential partner organisations (OMG, ISO reps, vendors, other). Proposals: use existing contacts in liaisons for invitations
  - Potential speakers, internal and external to CCSDS to be contacted, primarily by MC, for reports on themes like
    - History of CCSDS
    - Technology growth
    - Special applications
  - Entertainment?
- Panel Meetings
  - All panels to be on one location, location of festive gathering same as panel meetings, but:
  - Question: is it wise to stay in Houston for technical work? SPACEOPS will fill up all spaces in all respects
- ITC in San Diego in October 21- 24 an opportunity to split events?

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## TSG Status Report 20<sup>th</sup> Anniversary, cont., SPACEOPS Day: Examples of Themes



- CCSDS management level
  - CCSDS, why founded, 20 years history
  - CCSDS Organisation and Partners, ISO (SC13),...
  - Strategic and Operations plan
- Architecture
  - Layered model, reference architecture, services
  - SOIF
  - Data link architecture
  - Interplanetary Internet
- Our Recommendations and their background:
  - Required ca. two presentations per all nine (sub-) panels, which allow an understanding of the panels program and effort, A.I. given
- Applicability (mainly by agencies and vendors)
  - ESA Packet Utilisation standard, SCOS
  - CCSDS based Ground station architectures of agencies
  - Implemented Control Centre features (e.g. SLE)
  - CCSDS high compliant Space Crafts; presentation of benefit when using CCSDS
  - CCSDS compliant Space Craft subsystems (e.g. Encoders)
- Exhibitions (material should be in principal available from earlier events)
  - Booth: use of ITC booth sufficient?
  - Posters, CD-ROM, Brochure
  - Demonstrations and implementations on existing hardware / software. A.I. Placed on panels

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## TSG Status Report Preliminary 2001 Fall Meeting Schedule



- ITC 2001    Oct. 22 – 25    Las Vegas
- TC 2001    Oct. 29 – 31    ESTEC
- P1
  - 1A/B : Nov. 1        ESTEC
  - 1A/E : Nov. 2        ESTEC
  - 1B/E : Nov. 2        ESTEC
  - 1A :    Nov. 5 – 9    ESRIN
  - 1B :    Nov. 5 – 9    ESRIN
  - 1C :    Nov. 5 – 9    ESRIN
  - 1E:    Nov. 5 - 9    ESA HQ Paris
  - 1F:    Nov. 5 – 6    ESTEC
  - 1J:    Nov. 5 – 9    ESTEC
  - 1K:    Nov. 5 – 9    ESTEC
- Test WS    Nov. 1 – 2    ESTEC
- P2:        Oct. 22 – 26    CNES
- P3:        t.b.d.
- TSG:       Nov. 27        Orlando
- MC:        Nov. 28 – 29    Orlando
- SC13:      Nov. 30        Orlando
- Days off:    USA: Nov 22 : Thanksgiving,    Germany: Nov. 1: Allerheiligen (Nov. 2: off), Catholic holiday

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## **TSG Status Report Preliminary 2001 Fall Meeting Résumé**

**TSG meeting was very successful**

- Panel work reviewed
- Inter panel issues and special work items discussed
- Influence of Ops plan on future work identified
  - Implementations and testing addressed
  - 37 new Action Items allocated

**Thanks to all panel members and guests supporting TSG**

**TSG thanks NASA JPL for the excellent arrangements and cordial environment**

June 6 / 7 , 2001

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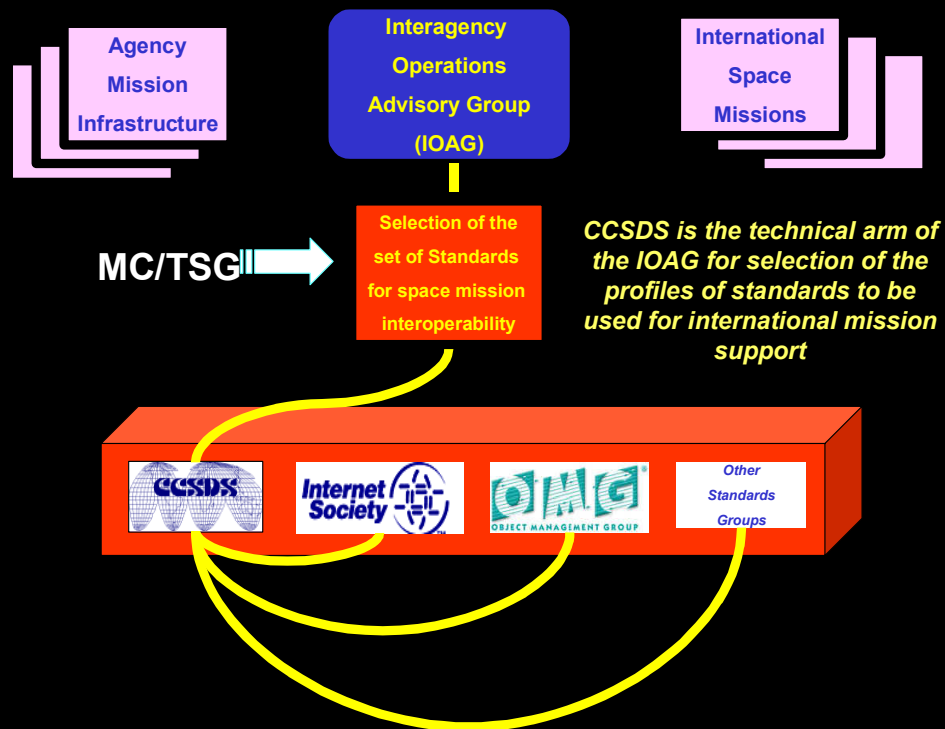
**Attachment N**  
**Interplanetary Internet Status Report**  
**by NASA/Adrian Hooke**

## Report on Liaisons: Internet Society

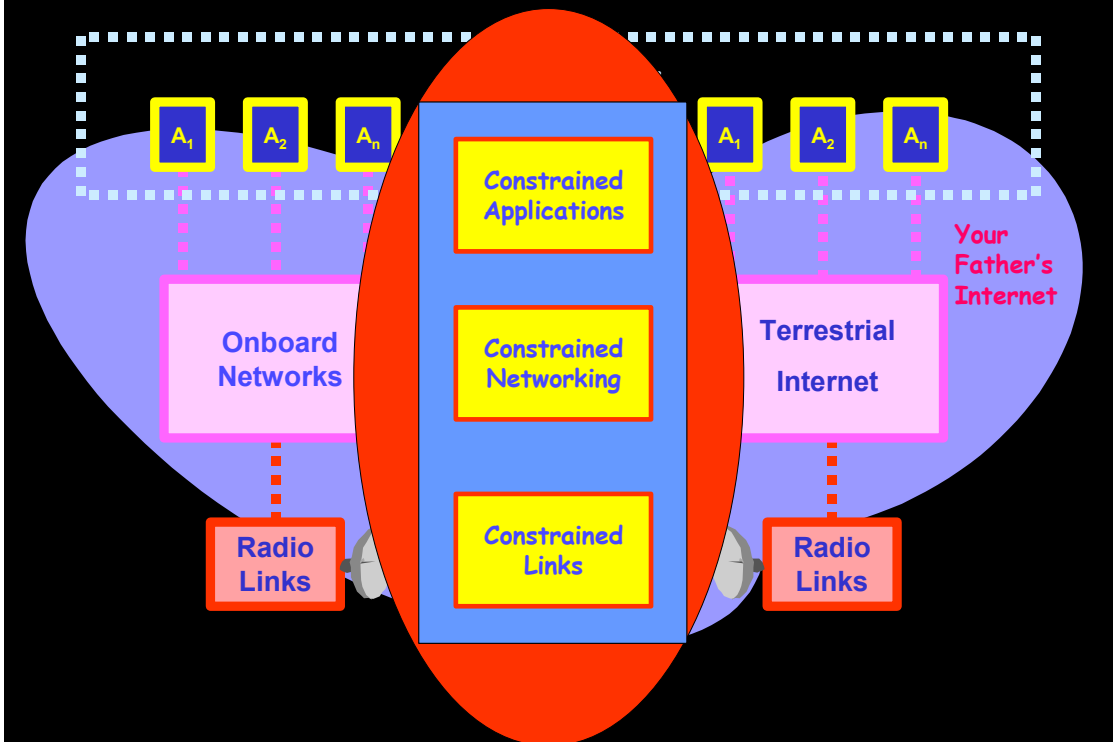
Adrian J. Hooke

CCSDS Management Council Meeting  
RAL, Oxford, UK  
07 June 2001

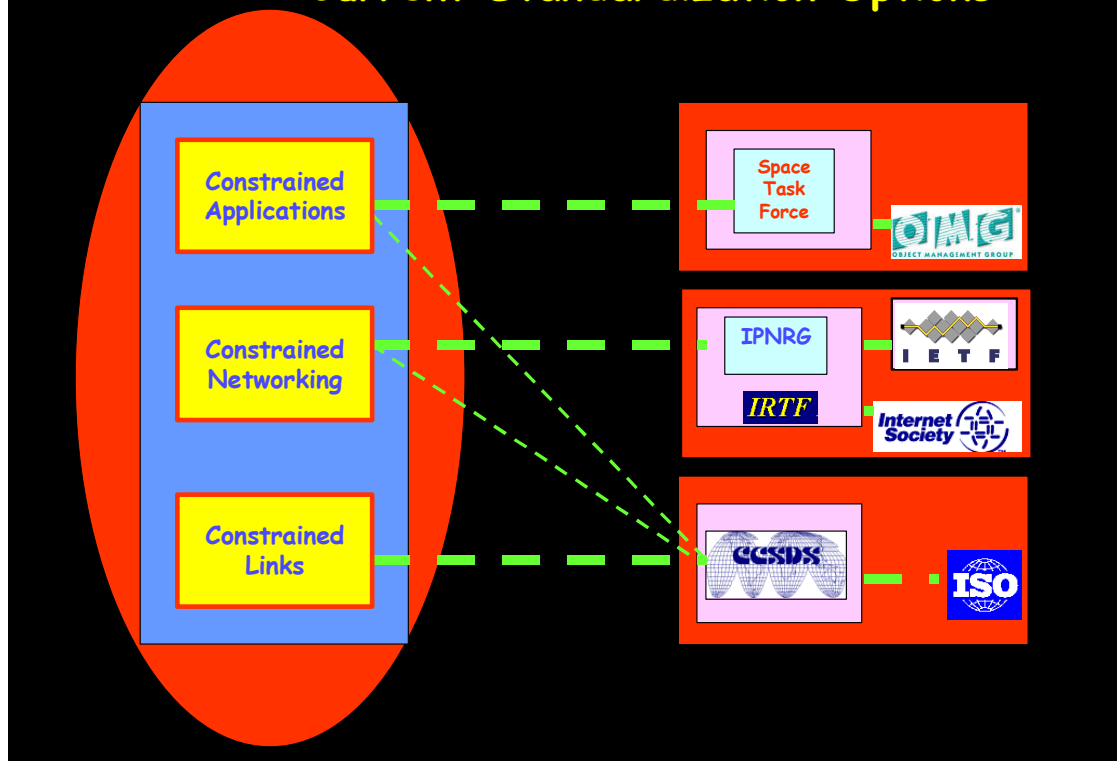
### International Interoperability

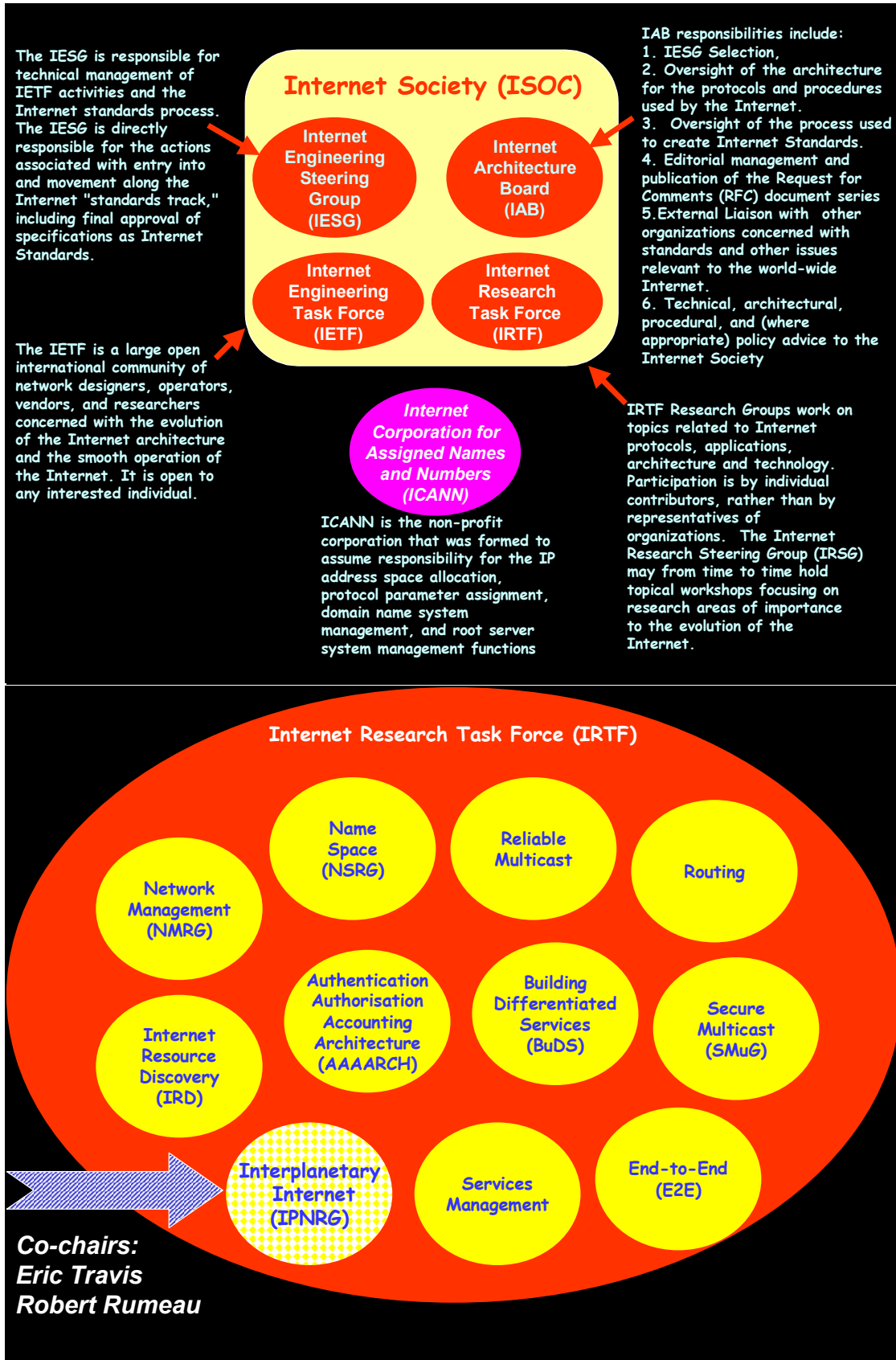


## Model of Space/Ground Communications



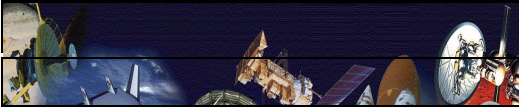
## Current Standardization Options





## Exploration of ISOC Liaisons

- Discussed with Scott Bradner, ISOC Vice President for Standards and head of ISOC liaisons
- ISOC has only ONE formal liaison
  - With the ITU
  - Required by formal ITU procedures
- Agreed that we already have sufficiently strong relationships between CCSDS and ISOC (via the IPNRG) so that formal liaison arrangements between the two organizations would currently be superfluous
- The relationships will be monitored to see if future needs would indicate that formal liaison statements are needed.



## The Interplanetary Internet:

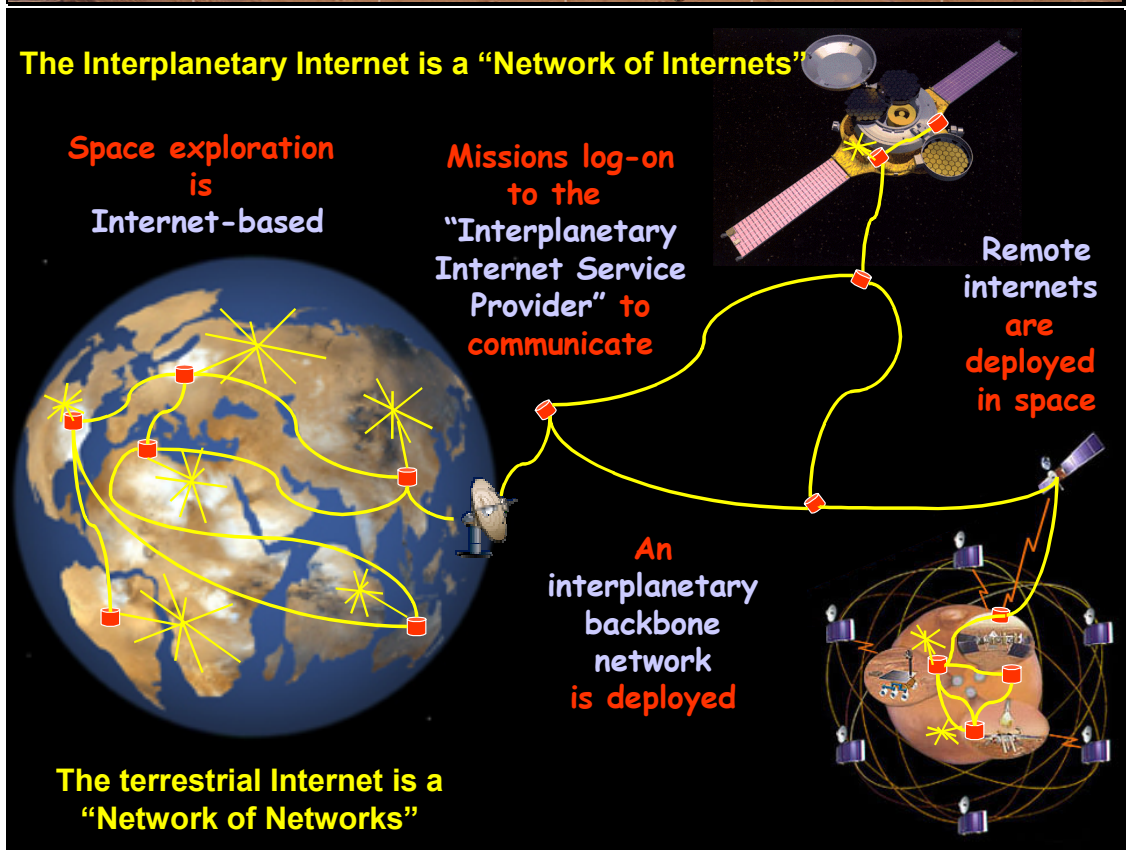
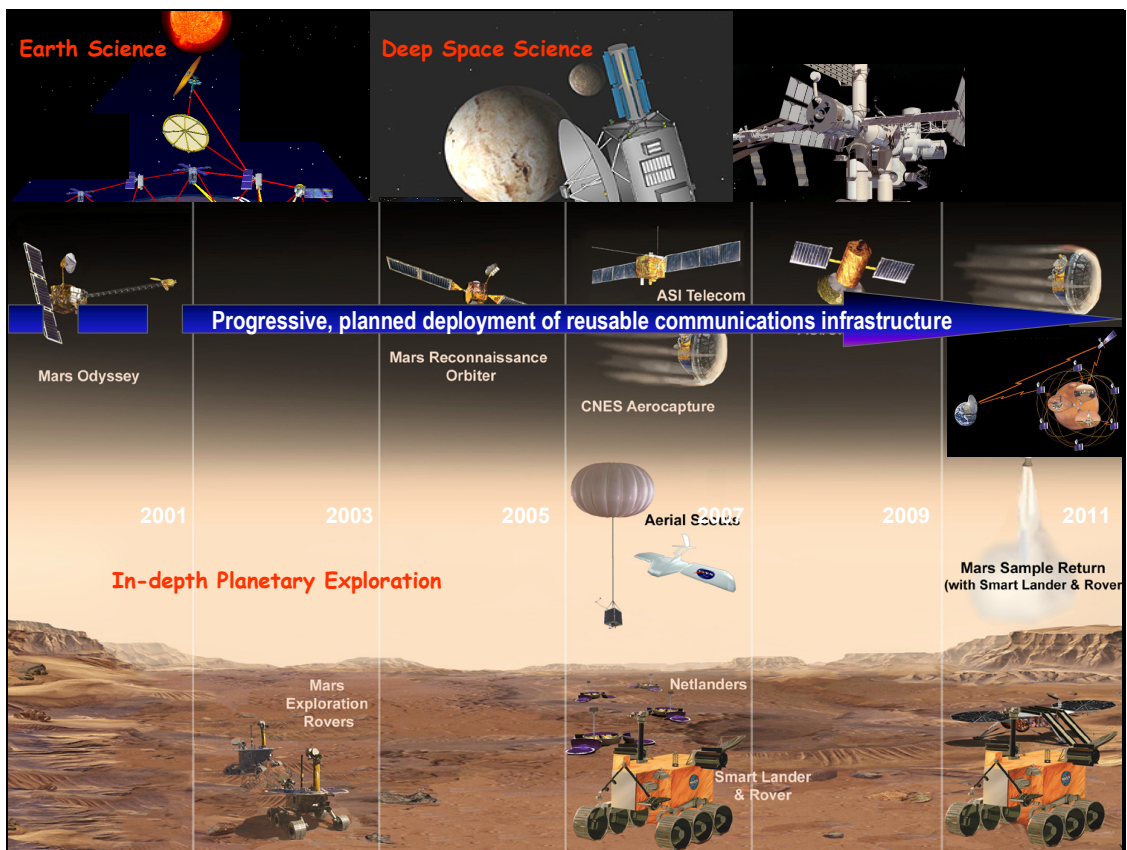
### Report to the CCSDS Management Council

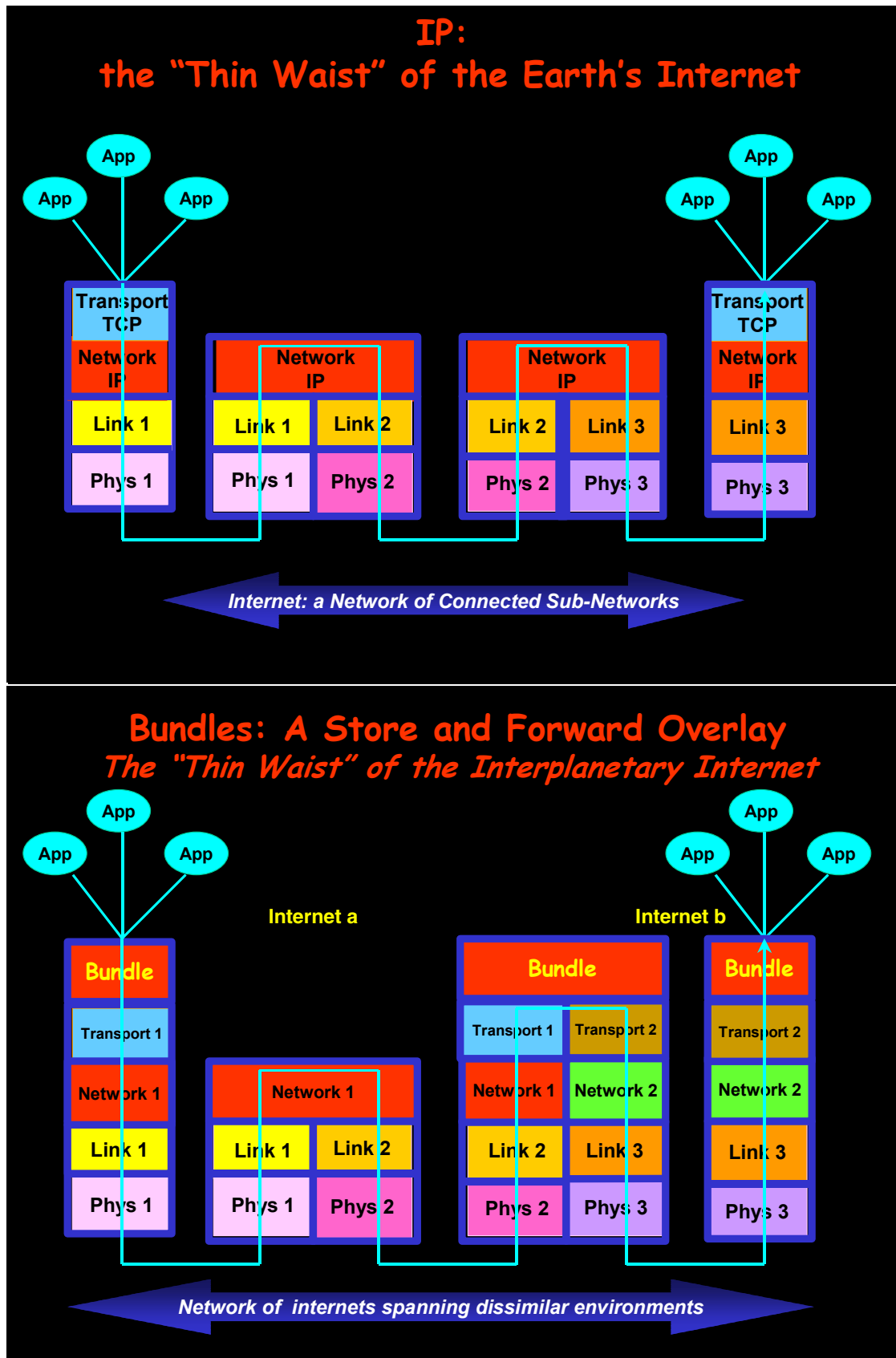
**Adrian J. Hooke**

RAL, Oxford, UK, 7 June, 2001

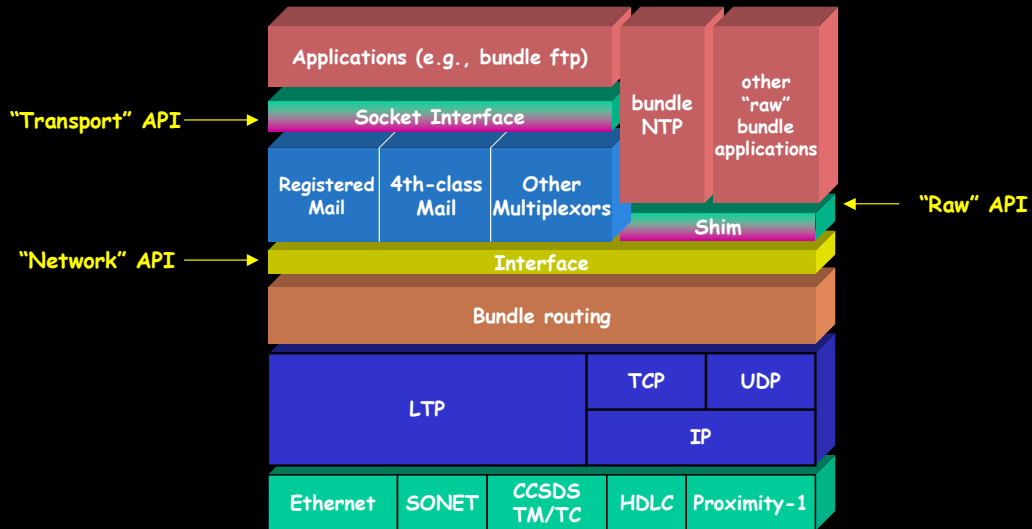
***Interplanetary Internet Research Group:***

*Scott Burleigh, Vint Cerf,  
Bob Durst, Adrian Hooke,  
Robert Rumeau, Keith Scott,  
Eric Travis, Howard Weiss*



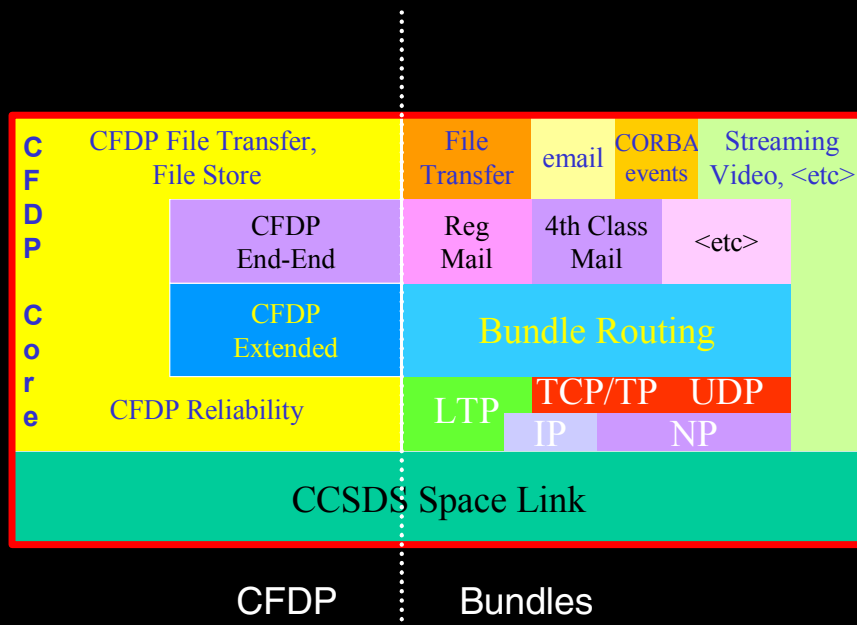


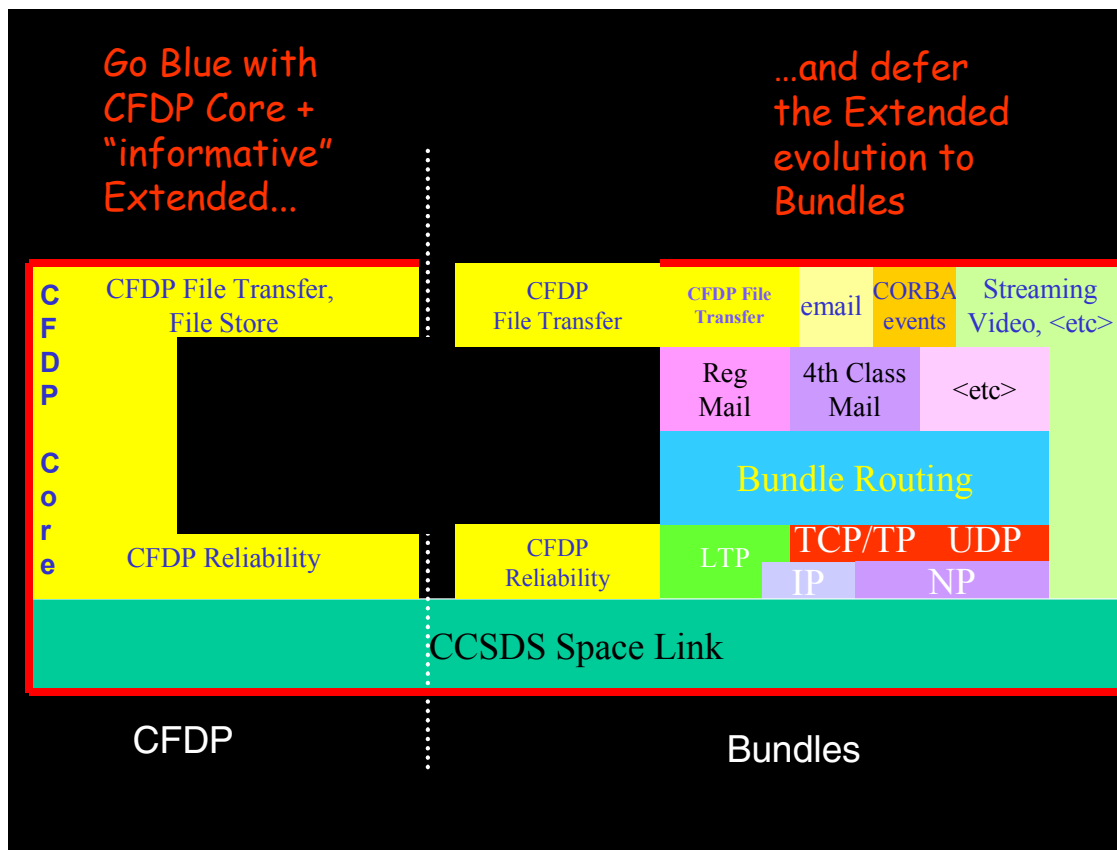
## "Bundlespace" Service Layering



*\* Security, if desired, lives in the purple stuff*

## CFDP and Bundles





## Status as of June 2001

- **May 2001: IPN architecture was issued as an Internet Draft:**

Title	Interplanetary Internet (IPN) Architectural Definition
Author(s)	V. Cerf et al.
Filename	draft-irtf-ipnrg-arch-00.txt
Pages	58
Date	18-May-01
A URL for this Internet-Draft is	
<a href="http://www.ietf.org/internet-drafts/draft-irtf-ipnrg-arch-00.txt">http://www.ietf.org/internet-drafts/draft-irtf-ipnrg-arch-00.txt</a>	
- **May 2001: JPL "Telecommunications and Mission Operations Directorate" (TMOD) was renamed the "InterPlanetary Network and Information Systems Directorate" (IPN-ISD) by new JPL Director, Charles Elachi.**
- **Architecture currently being Peer Reviewed:**
  - Presented at Internet Global Summit, Stockholm:
    - 1/2 day tutorial on 5 June
    - Plenary presentation on 6 June - prominent CCSDS exposure
  - University of Delaware on 12 July
    - Invited review by senior Internet experts
  - Special invitation to IETF/London for plenary IRTF session on 08 August
    - Probably in concert with 2-day IPNRG in London
  - Updated draft planned for September 2001
    - *Desire the IPN architecture to be reviewed by "all CCSDS"*
      - How will this be handled?